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WITNESS my hand this
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Field of the Invention

This invention relates to locks for displaceable wings, said wings including French Doors, Security Doors and Timber Doors and includes hinged and sliding doors.

Background to the Inventions

French doors, as defined below, typically employ a lock having a lock body that is mortiсed into the frame on the closing edge wing and handle assemblies that are mounted on each side of the wing adjacent the lock body to be connected to the lock body by a shaft. Now days, these doors are often closed against a strip of compressible sealing material located between the door and an element defining in-part the opening and against which the wing closes (this strip being to prevent energy loss) - this action requiring a not insignificant force.

These doors lend themselves to being urged fully closed by the operation of remote locks having plunger-like members that can be driven into receiving apertures of upper and lower elements of the opening.

Typically locks for common French Doors must have a lock body of small depth that is not more than about 40MM, a small setback not exceeding about 30MM, a small width not exceeding about 16 MM, a bolt that can extend at least 15 MM from the lock body and preferably means to displace rods at least 15 MM. Preferably, an industry standard for the distance between the cylinder and lever axii of 85.00 MM should also be observed.

Typically locks for common Security Doors require the lock to have a smaller lock body having depth not exceeding about 40MM, a setback of about 27MM, a width of about 14.5 MM and not exceeding 16MM, a bolt that can extend at least 14 MM from the lock body and preferably means to drive rods at least 11 MM. Preferably, the lock should also comply with the industry standard fitting apertures within the door.

In each case, it is difficult to comply with the space requirements imposed by the conditions described above because bolts needs to extend adequately into the casing when fully extended to be properly supported and this imposes restrictions on integers competing for space adjacent the bolt and because the lock body must fit within a frame extrusion this places restrictions on the bolt, casing and other component depths and widths that also must observe minimum strength requirements. Further more, it is preferable that the loc complies with Australian Standards for Security Doors, Glass Hinged Doors and Locksets that define strength, durability, corrosion resistance, and ease of use performance requirements.

Locks commonly employed in French doors in Australia do not provide compression, they are lockable only by key and it is not possible to lock the exterior lever while the interior is free to operated to enable egress and in many applications this is inconvenient and in some applications it is unsafe. Locks commonly employed in security doors in Australia do have locking by interior locking lever (snib-lever) but do not provide for locking of the exterior lever while retaining the interior lever free to be operated to enable egress.

The inventions herein, include locks that address the inadequacies of locks commonly employed in French doors and security doors.

The inventions herein, comprise improved complete locks and improvements for locks for displaceable wings that are not just limited to addressing the above described inadequacies of common Security and French Doors.

Summary of the Invention Some Claims defining the Invention Are:

According to the invention there is a lock including a casing, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing and operating means by which to displace the bolt towards the retracted position including a hand operable lever operably connected to the bolt by angularly displaceable means comprising an angularly displaceable unlatching rocker having an upper arm operably associated with the lever and a lower arm operably connected to the bolt and in some forms the bolt is an advanced bolt.

In some forms the lock includes a deadlocking slide, a cylinder and locking member wherein the bolt is deadlockable by the deadlocking slide to restrain it from displacing to the retracted position and the lock is lockable by the cylinder to restrain it from being unlocked by the locking member, said locking restraining the deadlocking slide from displacing from the deadlocking configuration.

In some forms the lock includes an angularly displaceable driver operably connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,

at least one hand operable angularly displaceable lever having a free end and at least one angularly displaceable unlatching cam to operably connect the bolt and driver to the at least one lever,

wherein the bolt is displaceable towards the casing by downward displacement of the free end and each connected drive member is displaceable towards and away from the casing by displacement of the free end.

According to the invention there is a lock including a casing, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

operating means by which to displace the bolt towards the retracted position including an exterior and an interior hand operable lever operably connected to the bolt by angularly displaceable means,

an adapted dead locking slide and a hand operable locking member that is operable to displace the said adapted locking slide, said adapted dead locking slide being displaceable by the locking member to a third locked configuration corresponding to the exterior lever being locked to be restrained against displacement,

said adapted dead locking slide being displaceable from the third locked configuration to unlock the exterior lever by displacement of the interior lever.

In some forms, the angularly displaceable means comprises an angularly displaceable unlatching rocker.

In some forms the bolt is an advanced bolt

According to the invention there is a lock including a bolt comprising a latch bolt having an alternative associated auxiliary bolt supported in the casing, said bolt being displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

operating means by which to displace the latch bolt towards the retracted position including an angularly displaceable unlatching rocker operably associated with an exterior and interior hand operable unlatching lever,

deadlocking means to restrain the latch bolt in the fully extended position including a common deadlocking slide biased towards the bolt, a cylinder including a key operable barrel that is operably connected to the common deadlocking slide, and a locking cam operably associated with the common deadlocking slide,

said common deadlocking slide being displaceable to the undisplaced position by the cylinder during which displacement the locking cam is actuated to a position in which it engages the deadlocking slide to restrain from being displaceable to engage the bolt, said locking cam being subsequently displaceable to release the said deadlocking slide to abut the bolt in preparation for latching and automatic deadlocking.

In some forms the bolt is an advanced bolt

According to the invention there is a lock including a bolt comprising an advanced latch bolt supported in a casing, said latch bolt being displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

deadlocking means to restrain the latch bolt in the fully extended position including an unlatching deadlocking slide that is biased towards the latch bolt,

operating means by which to displace the latch bolt towards the retracted position including an angularly displaceable unlatching rocker operably connected to the unlatching deadlocking slide,

the cylinder being operable to displace the deadlocking slide to the undisplaced position during which displacement the bolt is freed to inwardly displace and the unlatching rocker is displaced to retract the bolt.

In some forms the angularly displaceable unlatching rocker is operably connected with free movement to the unlatching deadlocking slide by a modified unlatching cam operably connected to the unlatching deadlockiung slide by a link member.

According to the invention there is lock including a casing, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

an angularly displaceable driver operably connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,

at least one hand operable angularly displaceable lever having a free end and at least one angularly displaceable unlatching cam to operably connect the bolt and driver to the at least one lever,

wherein the bolt is displaceable towards the casing by downward displacement of the free end and each connected drive member is displaceable towards and away from the casing by displacement of the free end.

In some forms the pivotal axis of the diver and unlatching cam are closely disposed

In some forms the lock includes the diver comprises a substantially annular member.

In some forms the lock includes the bolt is outwardly displaceable by actuation of the driver annulus

In some forms the lock includes the bolt is an advanced latch bolt

According to the invention there is a lock including a casing with sides, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

an angularly displaceable driver operablely connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,

deadlocking means by which to restrain the bolt in the fully extended position including a key operable cylinder and a deadlocking slide that is connected by a deadlocking slide extension to the driver,

said deadlocking slide being displaceable by the cylinder to displace the driver whereby to displace each connected drive member towards and away from the casing.

In some forms the bolt is an advanced bolt

According to the invention there is a lock including a casing having a front plate, an angularly displaceable driver operablely connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,

at least one hand operable angularly displaceable lever having a free end and at least one angularly displaceable unlatching cam to operably connect the driver to the at least one lever, each connected drive member being displaceable towards and away from the casing by displacement of the free end,

said lock further including a locking plunger that protrudes from the front to be displaceable to engage in a recess in the driver whereby to restrain the driver against displacement.

According to the invention, there are locks substantially as described herein with reference to and as illustrated in the accompanying drawings.

According to the invention, there are improved complete locks for displaceable wings and improvements for locks for displaceable wings substantially as described herein with reference to and as illustrated in the accompanying drawings.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Definitions and Conventions Employed

This specification and the provisional applications associated with this application, describe inventions comprising improved complete locks for displaceable wings and improvements for locks for displaceable wings that for convenience are referred to herein as locks. Throughout this specification and claims which follow,

unless the context requires otherwise, the word "locks" or variations such as "lock" will be understood to imply the inclusion of complete locks for displaceable wings and improvements for locks for displaceable wings that are transportable into other locks and locking devices without being limited to the complete locks described herein.

This specification describes locks substantially as described herein with reference to and as illustrated in the accompanying drawings.

Throughout this specification and claims which follow, unless the context requires otherwise, the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

Throughout this specification and claims which follow, unless the context requires otherwise, the positional prepositions such as rear, forward are used to assist in description of the preferred embodiments and with reference to the accompanying drawings and have in general no absolute significance.

Throughout this specification and claims which follow, unless the context requires otherwise, the word "preferably" or variations such as "prefer" does not mean nor infer that that the inventions described in the "Description of the Preferred Embodiments" are restricted to the form of an integer or collection of integers described as being preferred. Preferably means, one of multiple acceptable alternatives.

Throughout this specification and claims which follow, unless the context requires otherwise, the words wing embraces both doors and windows.

Throughout this specification and claims which follow, unless the context requires otherwise: **latching** means displacement of an engaging member against biasing means by an engageable means and subsequent displacement of the engaging member into engagement with the engageable means under the action of the **biasing means**, ([within this application] for hinged doors this comprises displacement of a latch bolt or {advanced latch bolt and an auxiliary bolt} towards the lock casing by the strike and subsequent displacement of the latch bolt into the **aperture** of the **strike plate** [and in conventional forms this comprises displacement of the latch bolt by a curved or angled wing or lip of the strike plate], and for sliding wings this comprises displacement of a latch bolt having a hooking portion or {advanced latch bolt with hooking arms and an auxiliary bolt} towards the lock casing and subsequent displacement of the latch bolt into the **aperture** of the **catch plate** to enable the hooks to overlap the aperture's peripheral edge whereby to longitudinally engage the catch plate; within this application a latch bolt is displaceable between a **fully extended position** in which it is engageable within an engageable means

aperture or recess and a **retracted position** where it is removed from the aperture or recess, (said retracted position coinciding with the bolt being substantially within the casing), (said fully extended position embracing a bolt that is substantially fully extended); a **latch-bolt** or **latch bolt** is an outwardly biased bolt capable of executing (or participating in) latching (and includes both rectilinearly displaceable and angularly displaceable bolts) and includes bolts having a leading end that is chamfered or otherwise profiled on one side to facilitate latching and includes **advanced latch bolts** that are restrained in a partly extended (pre-latching configuration) prior to latching and that are accompanied by an auxiliary bolt, said advanced latch bolts in some forms comprising a prism shaped bolt that in some forms include **counter-acting hooks**, said advanced latch bolts in some forms having a leading end that is chamfered, curved or otherwise profiled on both sides to assist or facilitate latching; an **auxiliary bolt** means an outwardly biased plunger that is operably associated with the advanced latch bolt; **unlatching** means withdrawal of the latch-bolt from engagement with the engageable means, (for hinged door it means withdrawal of the bolt from the aperture of the strike plate); an **unlatching lever** is a lever or knob that is hand operable to cause the latch-bolt to become unlatched; **locking** means configuring the lock to restrain it from being unlatched and in some forms of locks employing deadlocking slides, it includes restraining the deadlocking slide in an operative position to thereby restrain the bolt from being inwardly displaced by the unlatching lever; **deadlocking means** means to configure the lock to restrain the bolt from being displaced from the configuration that it assumes when engaged with the engageable means (in the case of a rectilinearly displaceable bolt for a hinged door, it means restraining the bolt in a fully extended position), the deadlocking means is some forms includes a **deadlocking slide** that is displaceable to cooperate with the bolt to restrain it against displacement; **deadlocked** means the bolt cannot be displaced from the extended position by external forces; **deadlatching** means the bolt is automatically deadlocked during latching; **remote lock** means a locking means disposed from the lock that includes a remote bolt that is operably connected to the lock (often there is an upper and a lower remote lock situated above and below the lock); **French door** means a door comprising a frame with a glass in-fill and often configured in pairs, a second door that is normally closed and is secured by vertical bolts and a first door that has the lock body and operable levers, often they have a strip of compressible sealing material located on the edge against which the first door closes to prevent energy loss, in may forms the door comprises a hollow frame where the hollow within the frame is comparatively small in depth, **security doors** means a door comprising a

hollow framed door with an in-fill of mesh or woven stainless steel where the hollow within the frame is comparatively small in depth and in width; **lock body** is the lock portion fitted within the hollow frame of the wing, the lock body together with a strike plate, a pair of handle sets and a cylinder comprising a typical mortice lock; **depth of lock body** is the extent of the lock body in a direction parallel to the face of the door; **width of lock body** is the extent of the lock body in a direction at right-angles to the face of the door; **single cylinder** is a cylinder comprising a key operable barrel within a **cylinder housing** connected to a **first cam** (in one form having a radially protruding arm); **free-rotation-double-cylinder** comprises a cylinder sub-assembly comprised of opposed barrels each connected with free movement to the same first cam such that the cam is free (between limits) to be angularly displaced while the barrels remain undisplaced, this type of cylinder being commonly used in security door locks in Australia to enable the cam to be displaced by either barrel to a locking configuration and then the barrel to be reverse rotated to an undisplaced position enabling key removal while leaving the first cam in the locking position, (this type of cylinder being distinct from the more commonly used double cylinders that employ clutches and that do not have free rotation between the barrels and first cam); **clutched-cam-double-cylinder** comprises a cylinder sub-assembly comprised of opposed barrels each connectable without free movement to the same first cam such that the cam can be angularly displaced by a barrel while the other barrel remain undisplaced, the cylinder includes a clutch to select which barrel is the operative barrel, said clutch being operated by key insertion. In forms of both clutched and free rotation cylinders, the interior key operable is replaced by a hand and operable turn knob.

Description of the Figures

Embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings in which:

Fig 1 is an isometric view of a wing with a lock supported adjacent an opening,

Fig 2 is an isometric view of handles and a lock body.

Fig 3 is a schematic side view of a lock body with the lid removed and placed beside the lock body, with the bolt fully extended, the unlatching cam at the "undisplaced orientation" with the deadlocking slide upwardly displaced by the cylinder screw to be in the "undisplaced position",

Fig 4 is an insert showing the deadlocking slide upwardly displaced to deadlock the bolt and to be in the "second locked configuration",

Fig 5 is an insert showing the deadlocking slide of Fig 1 further upwardly displaced to deadlock the bolt and to be in the "first locked configuration",

Fig 6 is the lock of Fig 5 in the first locked configuration when viewed from the other side

Fig 7 is the lock of Fig 1 with the deadlocking slide in the "undisplaced position" and the bolt displaced to the retracted position by the unlatching cam,

Fig 8 is the lock of Fig 1 with the deadlocking slide in the "undisplaced position" and the advanced bolt in the "pre-latching configuration"

Fig 9 is the lock of Fig 1, with the bolt fully extended, the deadlocking slide in the "undisplaced position" position, each unlatching cam displaced anticlockwise to fully displace the driver annulus,

Fig 10 is an isometric exploded view of the lock of Fig 1 from one side

Fig 11 is an isometric exploded view of the lock of Fig 1 from the other side ,

Fig 12 is the lock of Fig 1, but adapted to provide exterior lever locking and including an egress deadlocking slide – the lock being shown in the "third locked configuration",

Fig 13 is an isometric view showing the lock body and underside of the exterior handle assembly,

Fig 14 is the lock of Fig 1, but adapted to provide deadlatching

Fig 15 is the lock of Fig 1 adapted to be key operable and adapted to provide deadlatching and including a deadlatching deadlocking slide,

Fig 16 is the lock of Fig 1 adapted to be key operable and to provide actuation of remote locks

Fig 17 is the lock of Fig 1 adapted to be used in the subsidiary French Door

Fig 18 is an isometric view of a prism like bolt

Fig 19 is an isometric view of a chamfered prism like bolt

Fig 20 is an isometric view of a chamfered bolt

Fig 21 is an isometric view of a retracted prism like bolt with hooking arms

Fig 22 is an isometric view of an extended prism like bolt with hooking arms

Fig 23 is a plan view of the bolt of Fig 22

Fig 24 is a schematic side view of a lock where the elongated drive members comprise Bowden Cables.

Fig 25 is an isometric view of an improved strike plate.

The inventions described herein relate to locks for displaceable **wings 1** supported adjacent an **opening 2** as shown in Fig 1. The wing has a **closing edge 3** that in the closed position of the wing, is adjacent an **element 4** that helps defines the opening and the lock is mounted relative to this closing edge.

In some forms the lock comprises a mortise lock having a **lock body 5** that is mounted within the door and this lock body includes a **front plate 6** and an **engaging means 7** that is displaceable to engage with an **engageable means 8** mounted relative to the element.

Where the wing comprises a conventional hinged door, the closing edge is adjacent a **door-jamb 9 and door stop 10** when the door is closed and the engageable means comprises a **strike plate 11**. Where the wing comprises a conventional sliding door (not shown), the closing edge is adjacent a door-jamb when the door is closed and the engageable means comprises a catch plate.

Locks described within this specification include; locks that are lockable by the cylinder and interior locking lever; deadlatching locks that automatically deadlock on latching; and locks where the exterior lever is unlockable by operation of the interior unlatching lever. The locks described employ many common components.

Integers from which locks are comprised include, as shown in Fig 3, a **bolt 12 , a front plate 5** and a **casing 13** that in some forms comprises **sides 14** attached to each other by internal **fixed portions 15** by **rivets 16** that comprise extensions of the fixed portions that have passage through **apertures 17** in the casing sides. The front plate is preferably attached by **screws 18** having passage through **screw apertures 19** in the front plate to engage in **recesses 20** in the fixed portions, while in other cases a **spacer 21** is between the front plate and fixed portions to provide a lock of increased backset. In other forms, the front plate, the internal fixed portions and a side comprise a single member such as a single casting.

The latch bolt comprises a **first portion 31** that has passage through a **bolt aperture 32** in the front plate and a **return portion 33** within the casing. The bolt includes a longitudinal **support aperture 22** having an **opening 23** on the inside end of the bolt. Supported by the rear-casing wall is a T member comprising a vertical **plate 24** that is supported in a slotted aperture of the rear wall and an orthogonal forward projecting **guide pin 25** (preferably cylindrical) that protrudes into the support aperture to support the bolt – the bolt being supported by the frnt plate, guide pin and sides of the casing. Bolt includes an **advanced latch bolt 34** that is accompanied by an outwardly biased displaceable **auxiliary bolt 35** as shown in Fig 3 and 17.

The auxiliary bolt comprises a **first auxiliary bolt portion 36** that has passage through an **auxiliary bolt aperture 37** in the front plate and a **return auxiliary bolt portion 38** within the casing by which it is supported. The auxiliary bolt is outwardly biased by spring biasing means that in one form comprises a compression **spring 39** (Fig 3) that acts between the outer end of a **spring recess**

40 within the auxiliary bolt and a **vertical wall 41** of a casing fixed portion as shown in Fig 3.

The return portion, has a sideways protruding shoulder preferably comprising a cylindrical **side pin 42** that engages with a **profiled side recess 43** of an adjacent **control rocker 44** that is located within the casing adjacent a sidewall and beneath the latch bolt and auxiliary bolt and that is supported by a **pivotal joint 45** adjacent to the front plate (forward of the side pin) that defines a pivotal axis orthogonal to a side of the casing. The rocker extends vertically and rearwardly from its pivotal axis to terminate in a free end portion that has a **control shoulder 46** that is engageable with the bolt (to restrain the bolt) when the bolt is in the pre-latching configuration as shown in Fig 8. The profiled side recess includes an inwardly and upwardly **ramped edge 47** that lies in the same vertical plane as the side pin. The parts are configured such that as the auxiliary bolt is inwardly displaced, the pin slides along the ramped edge to cause the control rocker to displace away from the bolt to cause the control shoulder to displace away from the bolt to enable it to be displaced to the fully extended position by bolt biasing means. The control shoulder is engageable in an **edge recess 48** in the under-edge of the bolt that comprises a **slot 49** extending inwardly from a **slot end 50** when the lock is in the pre-latching configuration preferably has a surface that is defined by a **normal vector 51** that intersects the control rocker pivotal axis.

The profiled side recess also includes a substantially vertical **forward shoulder 52** that lies in the same vertical plane as the pin (in front of the pin) and that extends upwardly from the control rocker pivotal axis. The parts are configured such that during outwards displacement (from the retracted position) of the auxiliary bolt, the side pin engages the forward shoulder to cause the control rocker to rotate to cause to the control shoulder to displace upwardly towards the bolt towards engagement with the bolt. In some forms of control rockers, the side recess includes a substantially **horizontal elongation 53** that enables the auxiliary bolt to be inwardly displaced without substantially displacing the control rocker.

In some locks, the front plate can be removed to enable the control rocker and auxiliary bolt to be removed so one set (of control rocker and auxiliary bolt) can be substituted for another whereby to change the distance the auxiliary bolt and/or latch bolt protrude front the front plate in the pre-latching configuration.

In normal usage, the bolt is fully retracted by unlatching lever operation as shown in Fig 7 and the wing is opened whereby to enable the auxiliary bolt to fully outwardly displace. As the unlatching lever is then reversed towards the undisplaced position, the bolt outwardly displaces during which displacement the control shoulder

is displaced by the auxiliary bolt towards the bolt. In the pre-latching configuration the control shoulders enters bolt recess to restrain the bolt in the pre-latching configuration.

Integers include an **unlatching rocker 60** as shown in Fig 3, that is angularly displaceable about a **pivotal axis 61** orthogonal to the sides of the casing and between the latch bolt the unlatching cam/s described below. The unlatching rocker is supported by an unlatching rocker **shaft 62** that is some forms comprises a pinned extension of the casing and in other forms comprises a **rivet 63** that passes from one side of the casing to the other to both support the rocker and help fasten the casing sides, said unlatching rocker having a **first arm 64** extending upwardly from the pivotal axis to terminate in a engageable **shoulder 65** and a **second arm 66** extending downwardly to overlap the return bolt portion. In forms of the invention, the overlapping portion of the second arm includes a sideways protruding **drive pin 67** as shown in Fig 3 that locates in a **drive recess 68** in a side of the bolt.

Integers include means to outwardly bias the latch bolt that in one form comprises a **bolt torsion spring 69** supported around the unlatching rocker shaft that has a **free end 70** that acts on the second arm of the unlatching rocker (to outwardly bias it) and a **fixed end 71** restrained by the casing, the substantially cylindrical body of the spring being supported about the shaft.

Integers include operating means by which to displace the bolt towards the retracted position including at least one **unlatching cam 80** as shown in Fig 3 that is connected to a hand operable **unlatching lever 81** as shown in Fig 2. In some locks, the unlatching cam and lever are connected by a **shaft 82** that has passage through an aperture in the side of the wing and that mates within a **drive aperture 83** in the unlatching cam and a **drive recess 84** in the unlatching lever. Each unlatching cam has a downwardly extending **unlatching arm 85** that towards its free end has a **driving shoulder 86** that is rearward of the rocker first arm and within the same plane so that downwards unlatching lever displacement causes the driving shoulder to displace in a forward direction to displace the first arm of the unlatching rocker in a forward direction to cause the second arm to rearwardly displace to cause the bolt to retract. Each unlatching cam is preferably supported by at least one sideways protruding **cylindrical portions 87** that extends into a **circular aperture 88** in a side of the casing -this cylindrical portion also preferably including a portion of the drive aperture. In some locks, the unlatching cam is connected to a shaft that extends between an **exterior unlatching lever 89** and an **interior unlatching lever 90** as shown in Fig 2, while having passage through the mating drive aperture in each unlatching cam.

Integers include a **deadlocking slide 100** as shown in Fig 5 that is displaceable to and from a deadlocking configuration. The deadlocking slide has a **leading end 101** that is co -operable with the latch bolt to restrain the bolt from being displaced to the retracted position as shown in Figs 4 and 5. In some forms, the deadlocking slide has an **engaging shoulder 102** that is engageable behind an **engageable shoulder 103** of the bolt - the engaging shoulder laying in the same vertical plane as the engageable shoulder parallel the casing side. The configuration in which the bolt and slide cooperate as shown in Figs 4 and 5 is referred to herein as the deadlocking configuration and when so engaged the deadlocking slide can be said to be in a deadlocking position [this deadlocking position actually embracing a limited range of deadlocking slide positions over which the bolt and slide so cooperate] and [the specification embraces the latch bolt being within a limited range of extended positions over which the bolt and slide cooperate and from which the bolt cannot be displaced]..

In some locks the deadlocking slide is displaceable by operation of a **locking member 104 shown in Fig 2** that in some locks comprises an interior rectilinearly displaceable hand operable member supported relative to the interior handle assembly that has passage through a side of the wing to be connected to the deadlocking slide. In other locks as shown in Fig 2 the locking member comprises a hand operable angularly displaceable **locking lever 105** (commonly called a **snib-lever**) that is connected by a **spindle 106** to an angularly displaceable **locking cam 107.** The locking cam is preferably supported within the casing by **cylindrical portions 108** that extend into **circular apertures 109** in the sides of the casing. The locking cam has a **spindle aperture 110** to mate with the spindle. The locking cam also includes a locking arm having a displaceable **free end portion 111** that overlaps a portion of the deadlocking slide and has a sideways **protruding pin 112** that is within a substantially **horizontal slot 113** within the deadlocking slide.

Integers further includes an angularly displaceable **first cam 120** that is operably associated with the deadlocking slide by a **drive recess 121** having an **upper drive face 122** on which the first cam arm acts to drive the deadlocking slide towards the deadlocking configuration and having a **lower drive face 123** on which the first cam arm acts to drive the deadlocking slide from the deadlocking configuration and an **exit shoulder 124** (preferably comprising an angled face) connected to the upper drive face disposed such that when in the lock is in a first locked configuration, the first cam **end face 125** (a face of constant radius) abuts the exit shoulder so that a force applied on the first cam by the deadlocking slide when an attempt is made to move the deadlocking slide from the deadlocking configuration

(as might occur in an attempt to rotate the snib lever) has a **direction 126** that passes through the **pivotal axis 127** of the said cam and so the first cam cannot be rotated and the first cam in this configuration restrains the deadlocking slide in the deadlocking position. The lock can be displaced into and out of a **second locked mode** characterized by the first cam arm being within the drive recess and shown in Fig 4, by actuation of the interior locking lever and by actuation of the first cam, but the lock can only be displaced from the **first locked mode** shown in Fig 5 by actuation of the first cam (being displaceable into the first locked mode by actuation of the first cam). In some locks, the locking cam is unable to rotate sufficiently to displace the deadlocking slide to a position where the first cam can leave the drive recess while in other locks the deadlocking slide is displaced substantially the same distance by the locking cam and first cam but the first cam is biased against displacement. Preferably, the deadlocking slide supports a torsion **slide spring 128** having a **free arm 129** that extends rearwardly to intersect the locus of movement of the end of the first cam arm and a **fixed end 130** restrained by the deadlocking slide. The torsion spring is supported within a **cylindrical recess 131** in a side of the deadlocking slide and the spring arm preferably lies in the same plane as a central plain of the lock body and first cam. Parts are configured such that the first cam cannot leave the drive recess during normal operation without compressing the slide spring and when the lock is in the first locked configuration, the first cam arm and slide springs arm are substantially orthogonally disposed as shown in Fig 5.

In some locks, the deadlocking slide supports a spring loaded **ball 132** as shown in Fig 3 that is engageable in **recesses 133, 134, 135** in a side of the casing corresponding to an undisplaced deadlocking slide, a deadlocking slide in the second locking configuration and a deadlocking slide in the first locking configuration - in deadlatching forms of the lock, the ball and spring are omitted.

Some locks, (not including deadlatching and egress locks) include a deadlocking slide having an adapted leading end that includes a ramped (or otherwise profiled) shoulder that extends inwardly while extending upwardly. The said slide is configured such that as the deadlocking slide is displaced towards the deadlocking position, this ramp engages with the lower rear corner of the engageable shoulder of the bolt to urge and displace the bolt outwardly – the action taking place by dint of the ramp sliding over the corner to exert a force having an outwards component. In these locks the deadlocking configuration corresponds to a fully extended bolt.

Where the cylinder comprises a **free-rotation-double cylinder 136** a **cylinder screw 137** is employed to restrain the lock cylinder within the lock body,

said screw having passage through the lock body to be engage in a **threaded aperture 138** in the lock cylinder, and in these forms the screw also preferably performs the function of restraining the first cam within the drive recess by restricting the downward displacement of the deadlocking slide from the undisplaced (unlocked) position. In usage, after the cylinder has been inserted in the cylinder aperture in the lock body, the first cam is rotated to be within the drive recess at which time the cylinder screw is inserted to displace the deadlocking slide away from the initial position and to the undisplaced position (corresponding to the ball being in aperture) that does not allow the first cam to be displace downwardly to leave the drive recess.

Integers further includes **drive means 140** as shown in Fig 7 to operate at least one remote engaging member, said means including a driver member supported within the casing that is operably connected to each unlatching lever so that upwards displacement of a lever causes the driver member to displace to actuate each remote engaging member to an operative position and in some locks, upwards displacement also causes the latch bolt to be driven to the fully extended position and in other locks again employing a latch bolt, upwards displacement also causes the latch bolt to be driven to the fully extended position if it has not been caused to be fully displaced by the biasing means. In these locks, downwards lever displacement causes the driver member to actuate each remote engaging member from the operative position while causing the latch bolt to retract.

In some locks there is an upper and a lower remote engaging member each operably connected to the driver member by an upper and a lower elongated drive member respectively. The driver member in some locks is connected directly to one or both elongated drive members and in other locks the driver member is operably connected to one or both drive members by one or a pair of interspaced drive slides as the case may be. In some locks there is a pair of counteracting drive slides (an upper and a lower) that is supported within the lock body and which are connected to the driver member.

Preferably, the driver member comprises an angularly displaceable **driver 142** as shown in Fig 9 comprising an angularly displaceable **driver annulus 143** having a **base 144** and an annular **sidewall 145** defined in part by a **pivotal axis 144** orthogonal to the plane of a casing side. The driver annulus is preferably supported within [and in some forms by] a raised casing **annular wall 144** that completely or partly surrounds the drive annulus and in some forms, the driver annulus is supported by an axial cylindrical sideways protrusion of the driver annulus base comprising a protruding **pin 145** that locates within a circular **aperture 146** in a side of the casing.

In some locks, and as shown in Fig 9, the driver annulus is connected directly to the **upper elongated drive member 146** by a **first joint 147** and operably connected to the **lower drive slide 148** by a **second joint 149.** The first and second joints accommodate relative angular displacement between the driver annulus and drive slide and elongated drive members. Where upper and lower elongated drive members are to be counteracting and the operative configurations correspond with outwardly displaced drive members, the first joint is rearwardly disposed of the pivotal axis and the second joint is forwardly disposed and preferably for practical reasons, the joints are on opposite sides of the driver annulus

In some locks, the driver and each unlatching cam are closely disposed (to require less space within the casing and for other reasons) with this proximity being defined in-part by the pivotal axis of the driver and driver annulus being closely disposed. In some locks, the cylindrical portion of each unlatching cam is supported in an aperture in a casing side-wall that is within the annular driver circumference and in cases where the driver member takes the form of a driver annulus, each unlatching cam is supported within the driver annulus side wall. In some locks, (not shown) the driver member pivotal axis intersects each unlatching cam.

The driver side wall as shown in Fig 9 includes a **locking shoulder 151** and an **unlocking shoulder 152** that in a form of the member shown in the figures, is defined in-part by a **driver drive recess 153** there between and each unlatching cam includes a **drive arm 150** comprising a substantially horizontal radial extension that extends from the unlatching cam into the driver drive recess to overlap the side wall. The shoulders and are angularly spaced such that when the driver member is undisplaced and each unlatching lever is undisplaced, each drive arm abuts the locking shoulder and when the lever is lifted to fully displace the driver member (to actuate the drive slides to operate remote locks) each drive arm engages the locking shoulder to displace it downwardly, and when the lever is then returned to the undisplaced position each drive arm abuts the unlocking shoulder. When the lock is unlatched by pushing the lever down, a drive arm displaces the unlocking shoulder to the undisplaced position to unlatch remote locks during which displacement the unlatching rocker is displaced to cause the latch bolt to retract. Preferably, the fully retracted latch bolt coincides with an undisplaced driver member.

In locks, (where the first portion of the latch bolt is required to have maximum and there is no space between a casing side and the latch bolt for other components, and for other reasons) the lower drive slide comprises a vertically substantially rectilinearly displaceable slide positioned at the rear of the casing as shown in Fig 9 and in these locks, the second joint is connects by an angled **intermediate member**

154 to the **free end 155** of an **intermediate rocker 156** by a **pin-joint 157,** said rocker extending from a **pivotal joint 158** shared with the casing (and located adjacent the front plate) to its **free end 159** disposed rearwardly of the casing. The free end also shares a **pin joint 160** with the **rearwardly disposed lower drive slide 161** that extends from the pin joint towards the lower end of the casing. The intermediate member and rocker each have a pivotal orthogonal to a side of the casing. In normal usage, rotation of the driver annulus in a locking direction (anti-clockwise) by lifting the free end of an unlatching lever drives the upper elongated drive member upwardly and the lower drive slide downwardly by causing the intermediate member to pull the rocker downwardly. Preferably the upper drive member and lower drive slide displace simultaneously in opposite directions and preferably the total displacement of each is identical (although at any intermediate position this may not be so) and so preferably the lengths of the intermediate member, the length of the rocker and the location of the joints are configured to provide such. Rotation of the driver member in a unlocking and unlatching direction (clockwise) by lowering the free end of an unlatching lever drives the lower drive slide upwardly and the upper drive member downwardly.

Where the bolt is to be outwardly drivable by each unlatching lever, the driver annulus is further configured such that when the driver is fully displaced in a locking direction a shown in Fig 9 the **secondary driven shoulder 170** of the unlatching rocker abuts the **secondary driving shoulder 171** of the driver and when the driver is undisplaced a shown in Fig 3 the secondary driven shoulder of the unlatching rocker is disposed from the secondary driving shoulder of the driver so as not to affect its movement. This functionality is particularly applicable to doors having seals.

In some locks as shown in Fig 6, the deadlocking slide is connected to a vertically elongated **driver locking slide 162** that has a **stop shoulder 163** that is displaceable into a **driver locking recess 164** of the driver to restrain it from being displaced from the fully displaced position corresponding to fully outwardly displaced drive slides – this restrained configuration corresponding to a first locked configuration of the lock.

In some locks, there is also a **subsidiary locking recess 165** of the driver that is utilized to restrain it from being displaced from the undisplaced position (corresponding to retracted drive slides and a lock in the first locked configuration). In should be understood that the locking provided by the driver locking slide is additional to the locking provided by the deadlocking slide cooperating with the bolt as described above and where when the bolt is restrained by the deadlocking slide,

the unlatching rocker is restrained by the bolt and so each unlatching lever cannot be operated.

In some locks, there is means of releaseably restraining the driver member in the fully displaced position and to restrain the driver member in the undisplaced position as shown in Fig 9, said means including **recesses 173** within the side of the drive annulus and a **ball 174** biased towards the annulus by **spring 175** wherein the spring and ball are located within a substantially **radially extended recess** within the casing that intersects the recess for the driver annulus. When the driver annulus is in either the fully displaced or undisplaced position the ball is aligned with one of the radial recesses.

Although (in the locks described immediately above) there is provision for operating remote locks, it will be appreciated that they may not, and need not, always be employed with the locks described above as the locks operate quite satisfactorily without remote locks – for this reason it can be said that the remote locks or remote engaging members are operably connectable to the driver and are connectable to the drive slides because they can be connected when so desired.

In the context of this specification, a remote lock or remote engaging means or remote engaging member all include a simple plunger like member connected directly to a vertically elongated member that is connected to a drive slide and they all include a more sophisticated device where a remote bolt is actuated by an intermediated mechanism that in some cases includes a remote lock casing and in some cases includes means for separately deadlocking the remote bolt, wherein said independent deadlocking is effected by displacement of the associated drive slide. The operative configuration of a remote engaging means is that in which it acts to restrain the wing in which it is supported.

Integers further include a latch bolt having a first portion comprising a substantially prism-like solid as shown in Fig 19 that is adapted to be slightly angled inwards on both sides to assist the bolt enter the aperture in the catch plate or strike plate whereby **each side 301** commencing at a position disposed towards the front plate (of the fully extended bolt) slopes inwardly towards the leading end to (over the length of the bolt) reduce the bolt width on each side by length **["wr"]** – this angling of each sides being different from that described below that addresses inwards displacement of the latch bolt during latching. These bolts preferably include at least one a full width **bridge portion 302** within the generally angled sides described above that is defined in-part by two parallel horizontal planes, this bolt being employed with a **ramping strike plate** that includes a substantially rectangular aperture as elsewhere described having a width substantially the same as the bolt

(plus operating clearance) but further including an additional **clearance aperture 390** shown in Fig 25 extending exteriorly from the aperture and in a position adjacent each bridge. The clearance apertures extend horizontally for a distance not less wr defined above and for a vertical height not less than the height of the bridge plus the vertical clearance between the aperture and general bolt. This configuration enables the bolt of a lock in a partly open wing to latch whereby to enter the aperture when a hinged wing is partly open. This functionality pre-disposes a bolt to be driven outwardly by deadlocking slide displacement and/or by actuation of the driver annulus as described above. These forms of bolts (both advanced and otherwise) find application in wings that must be closed against a seal and that require a force to be applied to fully close the wing. In usage the wing would be closed by hydraulic closer or by hand to cause the bolt to latch and the unlatching lever would then be lifted to actuate the bolt and drive remote engaging members to the operative position.

The above described integers and combinations thereof are configurable to so:

- the upper and a lower drive slide each displace 15 MM range
- the bolt when fully extended protrudes 16 MM from the casing
- the bolt has a width of 12. MM
- the casing has a external width of 15.5 MM
- the casing internal width is 12.5 MM plus working clearance for the bolt
- the backset is 30 MM
- the casing depth is 41 MM
- the unlatching levers that rotate less than 40 degrees to unlatch
- the distance between cylinder and lever axii of 85 MM
- the bolt is in the middle of the front plate
- the front plate is interchangeable
- the auxiliary bolts are interchangeable
- the backset can be changed by the addition of spacers
- the casing length does not greatly exceed 155 MM

LOCKS DERIVED FROM THE INTEGERS DESCRIBED ABOVE

Egress locks having a lockable exterior unlatching lever

In egress locks as shown in Fig 12 and 13, the interior locking member is operably connected to a stop blade within the exterior handle assembly – the locking member being displaceable to displace the deadlocking slide into the deadlocking

configuration while causing the stop blade to engage a member associated with the exterior lever to restrain the lever against displacement. The deadlocking slide is displaceable from the deadlocking configuration by rotation of the interior lever as described below.

In egress locks, the exterior unlatching lever is connected to an **outer unlatching cam 200** by an **exterior shaft 201** and the interior unlatching lever to be connected to an **inner unlatching cam 202** by a separate **interior shaft 203** - each shaft mating with its respective associated unlatching cam and lever and each unlatching cam being supported adjacently each other and each having an unlatching arm as described above and each preferably having a drive arm as described below and each being independently actuateable to cause the latch bolt to retract.

In egress locks, (where the locking member is angularly displaceable), the lock includes a **free-displacement locking cam 204** through which the spindle has passage to mate within a **lever locking cam 205** supported on the underside of the **exterior lever backplate 206.** The free-displacement locking cam is operably connected with free displacement to an **egress deadlocking slide 208** (as described below) by an arm having a displaceable **free end portion 209** that overlaps a portion of the said slide, said free end portion having **upper and lower drive shoulder 210 and 211** respectively within a substantially **horizontal slot 212** within the egress deadlocking slide to mate with relative vertical free displacement and with relative free sideways displacement such that when the locking lever is in a disposition corresponding to an exterior locked lever, the egress deadlocking slide is in the third locked configuration, the upper shoulder is adjacent the upper shoulder of the slot and there is free space between the lower shoulder and the upper shoulder of the slot to enable the egress deadlocking slide to be displaced by cylinder to the first locked configuration without causing the locking cam to angularly displace. The egress deadlocking slide includes a **deadlocking shoulder 213** that lies in the same vertical plane (a plane parallel a casing side) as the engageable shoulder of the bolt and that is engageable with the engageable shoulder to restrain the bolt. Adjacently, there is a ramped **unlocking shoulder 214** that lies in the same plane (a plane parallel a casing side) as the unlatching rocker. In the **third locked configuration** both shoulders are rearwardly disposed of the bolt, the deadlocking shoulder to restrain the bolt from being inwardly displaced and the unlatching rocker to be displaceable by the unlatching rocker as it displaces to retract the bolt. The unlocking shoulder is engageable by a **nose portion 215** of the second arm of the unlatching rocker as it rearwardly displaces to retract the latch bolt. In these locks, the bolt drive

recess is of sufficient width to enable the unlatching rocker drive pin to freely displace (while the bolt remains undisplaced) so the nose portion can slide up the unlocking shoulder to displace the deadlocking slide downwardly whereby to displace the deadlocking shoulder from behind the engageable shoulder to enable the bolt to inwardly displaced by further unlatching rocker displacement while displacing the locking cam to drive the spindle to unlock the exterior lever.

. [Alternatively if deadlocking is not required, the egress deadlocking slide includes a ramped or radiused unlocking shoulder that in the third locked configuration (a configuration otherwise corresponding to the second locked configuration described above) is rearwardly disposed of the latch bolt and that is engageable by the lower rear corner portion of an inwardly displacing bolt to cause the deadlocking slide to downwardly displace to cause the locking cam to be rotated in an anticlockwise direction to actuate the lever locking cam in an unlocking direction}

In egress locks, the lever locking cam supported coaxially with the spindle on the underside of the **exterior lever backplate 216**, has an **arm 217** by which the spindle and locking cam are operably connected to a **stop blade 218** that is upwardly displaceable by spindle rotation from an undisplaced position, to engage in a **stop slot 219** of a **stop washer 220** attached coaxially to the **shaft portion 221** of the exterior lever. The components are configured such that when the locking lever and spindle are undisplaced, the exterior lever is unrestrained but if the deadlocking slide is in the third locked configuration, the stop blade is within the stop recess restraining the exterior lever against displacement. In usage, when the interior lever is pushed down to retract the bolt, the deadlocking slide is displaced to angularly displace the locking cam to angularly displace the spindle to unlock the exterior lever. As will be appreciated, the exterior lever can be both locked and unlocked by the cylinder from either side and by the locking lever. The stop blade preferably comprises a part of a rectilinearly displaceable **stop slide 222** supported between the **side walls 223** of the exterior back plate and biased by compression **spring 224** away from the stop washer – said spring being supported within a vertically elongated spring **slot 225** of the stop slide to act downwardly on the **lower end 226** of the spring slot while acting upwardly on a **screw or screw boss 227** that intersects the spring slot to retain the slide adjacent the back plate. There are preferably a pair of horizontally opposed arms disposed on opposite sides of the **spindle pivotal axis 228**, each arm terminating in an engaging profiled **shoulder 229** and the **horizontal lower edge 230** of the stop slide includes a pair of **recesses 231** one recess engageable by a shoulder and the other recess engageable by the

other shoulder. When the stop slide is undisplaced, each shoulder abuts the horizontal lower edge of the stop slide and when the lever locking cam is in a displaced position corresponding to the third locked configuration, one of the shoulders is within a recess. The recesses and shoulders are configured such that the stop slide biased by the spring cannot dislodge a shoulder from its recess (this being possible by spindle rotation alone) because the vector defining the normal to the surface of the recess at the point of contact by the shoulder is configured to pass through the pivotal axis of the lever locking cam. It will be appreciated that this arrangement also biases the locking lever towards an undisplaced position.

Deadlatching locks operable by unlatching levers

In some locks having an advanced latch bolt, the bolt automatically deadlocks when it extends to the fully extended position as shown in Fig 14 and 15 – these locked being called deadlatching locks. Some of these locks employ a deadlocking slide having a **spring wing 240** and there is a **spring recess 241** within the casing (or deadlocking slide) and a **spring 242** that fits within the spring recess to act on the spring wing to urge the common deadlocking slide towards the bolt. With a view to standardising components, this deadlocking slide has been designed to be substituted for the deadlocking slide described above in which locks the spring wing performs no function – this deadlocking slide being referred to herein as a **common deadlocking slide 243**. The deadlatching lock in some forms includes a stop pin that passes between casing sides in the locus of displacement of the deadlocking slide to restrain the deadlocking slide from displacing sufficiently towards the bolt lock to enable the first cam to depart the drive recess.

In these locks, the locking cam arm is operably connected with free movement to the common deadlocking slide by a locking arm having a displaceable **free end portion 244** having **upper and lower drive shoulder 245 and 246** respectively within a wide substantially **horizontal slot 247** within the common deadlocking slide to mate with relative vertical free displacement and with relative free sideways displacement such that when the common deadlocking slide has been displaced against biasing to the undisplaced position by the locking lever, the locking lever and cam can be further angularly to cause the lower shoulder to leave the drive recess by sliding along a **lower exit shoulder 248** of the slot, said exit shoulder in this configuration being defined in part by a vector normal to the surface that passes through the pivotal axis of the locking cam. When so configured, the common deadlocking slide is restrained against displacing towards the bolt by the locking cam – this configuration being called a **spring-loaded locking 249** configuration.

The upper shoulder is displaceable by the upper shoulder of the slot when the common deadlocking slide is downwardly displaced by actuation of the first cam. The slot has adjacent the locking cam a downward protruding **accelerator shoulder 250** (that disposed closer to the pivotal axis of the locking cam than the free end portion) and the lock is further configured such that when the common deadlocking slide has been downwardly displaced by actuation of the first cam to a position close to the undisplaced position, the lower drive shoulder is adjacent the lower exit shoulder, and further downwards displacement of the common deadlocking slide brings the accelerator shoulder into contact with the locking cam arm to cause the arm to be displaced so that the lower drive shoulder is displaced up the lower exit shoulder to cause the slide to be restrained as described above.

In usage, when the bolt is in the pre-latching configuration the first cam can be actuated to release the lock from the spring loaded locking configuration so that when the bolt extends on latching (during which the bolt slides over the common deadlocking slide while restraining it against biasing means), the deadlocking slide is displaced by biasing means to deadlock the lock. Alternatively, after latching the first cam can be actuated to release the lock to immediately deadlock the bolt. To unlatch the lock either the locking lever or cylinder can be operated to drive the lock into the spring loaded locking configuration after which an unlatching lever is operated to unlatch the lock. However, if the lock has been locked to a first locked configuration it can only be unlocked from this configuration by actuation of the first cam.

Deadlatching locks operable by cylinder

In other deadlatching locks having an advanced latch bolt the unlatching levers are omitted as shown in Fig 15, and the latch bolt is displaceable to the retracted position by actuation of the deadlocking slide by actuation of the of the first cam and/or by actuation of the locking cam. In other cases an accessible hand operable member is connected directly to the deadlocking slide. In these locks, the deadlocking slide is connected to a vertically elongated **link 260** by the **pin joint 261**. The upper end of the link extends beyond and adjacently to a **connecting arm 262** of a modified **unlatching cam 263** that has a sideways protruding **pin 264** that extends into a vertically elongated **recess 265** within the link. The modified unlatching cam includes the **driving shoulder 266** that is engageable with the unlatching rocker and that is otherwise substantially the same as that described above. The lock is configured such that when a **deadlatching deadlocking slide 267** (being a deadlocking slide as the common deadlocking slide but including a leading end having a **ramped shoulder 268** that extends rearwardly while extending upwardly to provide clearance for the bolt to displace inwardly) is in the deadlocking

configuration, the leading end is behind the engageable shoulder of the bolt. During subsequent displacement of the said slide from the deadlocking position, the first part of the displacement is devoted to removing the engaging shoulder from behind the engageable shoulder [to enable the bolt to be inwardly displaced] during which displacement the pin slides relatively within the recess. During the second part of the displacement, the pin abuts the upper end of the recess to be acted on by the link to be displaced downwardly whereby to displace the modified unlatching cam to displace the unlatching rocker to cause the bolt to be inwardly displaced. The lock is configured such that the deadlatching deadlocking slide in the undisplaced configuration when the bolt is fully retracted. In the pre-latching configuration, the bolt is restrained from outwardly displacing by the control rocker and the deadlatching deadlocking slide abuts the bolt to be restrained against displacement. During latching the auxiliary bolt is depressed to displace the control rocker from the bolt, the bolt is inwardly displaced and subsequently displaced to the fully extended position to as a consequence free the deadlatching deadlocking slide to enable it to be displaced by biasing means up behind the bolt. This lock is electively configured to have a first and second locked configuration as described above. In other forms the lock includes a stop pin that passes between casing sides into the locus of displacement of the deadlocking slide to restrain the deadlocking slide from displacing sufficiently towards the bolt lock to enable the first cam to depart the drive recess.

Locks where the remote locks are operable by cylinder

In some locks as shown in Fig 16, each drive arm and the driver locking slide are omitted and the driver annulus is operably connected to the deadlocking slide by a vertically elongated **deadlocking slide extension 270** that preferably comprises a rod that extends along the rear of the lock that has a return portion at each end, one of which shares an **alternative first pin joint 271** with the driver annulus and the other shares a pin joint with the deadlocking slide. In this form of lock, the deadlocking slide is preferably configured to displace about 11 MM as is common in security door locks. However, if the axis of the alternative pin joint is a lesser radial distance from the axis of the annulus than the first pin joint and they are co-radial then a displacement by the deadlocking slide causes a larger displacement of the drive slides sharing first and second pin joints. By this means the drive slides can be displaced15 MM by operation of the cylinder. In these forms of locks, the remote bolts are operated by actuation of the key and/or locking lever as is common in security door locks. The locks are configured such that the undisplaced configuration

of the deadlocking slide corresponds to the undisplaced configuration of the driver annulus.

Lock for the subsidiary door of double French Doors

In some locks as shown in Fig 17, the latch bolt, auxiliary bolt and locking cam are omitted to provide a lock for the subsidiary door (that which has the strike plate attached) of a pair of French doors, said lock having one or a pair of remote bolts operated by an unlatching lever as described above. In other locks, the lock body is adapted to include a **recess 280** for an outwardly biased **locking plunger 281** (not shown but similar to the auxiliary bolt) that is positioned adjacent the driver member that when depressed engages in a **peripheral recess 282** of the driver annulus to restrain it from being displaced from the fully displaced position corresponding to extended remote bolts. This locking plunger is depressed when the other door is closed wherein the front plate of the lock of this door slides over the locking plunger to depress it to engage in the peripheral recess – by this means the subsidiary door is locked by the closing of the first door that preferably employs a lock with a latch bolt as described above.

Conventional passage lock where the latch bolt operated by lever from either side at all times.

This lock has an outwardly biased latch bolt – advanced or other, at least one unlatching cam, an unlatching rocker, interior and exterior levers connected by a single shaft to the unlatching cam, no cylinder nor locking member and the deadlocking slide and locking cam may electively be included. This lock may electively be configured to operate remote locks.

Conventional privacy lock having a latch bolt operated by lever from either side except when levers are locked by locking lever (snib) on inside.

This lock has an outwardly biased latch bolt – advanced or other, at least one unlatching cam, an unlatching rocker, interior and exterior levers connected by a single shaft to the unlatching cam, no cylinder, a locking member, deadlocking slide and locking cam.This lock may electively be configured to operate remote locks.

In this lock, the exterior handle set is adapted to include an exterior locking lever comprising hand operable coin slot that is connected to the locking cam by an extension to the spindle.

Conventional patio lock where the deadlocking latch bolt is operated by lever from either side except when outside lever is locked by locking lever on inside. Automatic unlocking when inside lever is rotated or unlocked by locking lever.

This lock has an outwardly biased latch bolt, an unlatching rocker, a locking member, a locking cam and an egress deadlocking slide, a lockable exterior lever

and an interior unlatching lever each connected by separate shafts to separate unlatching cams. The improved lock described above may be configured to operate remote locks.

Conventional entrance lock where the deadlocking latch bolt is operated by lever from either side except when outside lever is locked by locking lever on inside. When outside lever is locked, the latch bolt is retracted by employing the exterior key to displace the deadlocking slide to the undisplaced position to enable the exterior lever to be operated or by rotating the interior lever. The locking lever must be operated to unlock exterior lever.

The lock has an outwardly biased latch bolt, an unlatching rocker, a locking member, a cylinder with a key operable barrel and an egress deadlocking slide, a lockable exterior lever and an interior lever each connected by separate shafts to a separate unlatching cam, no locking cam and the spindle passes through an aperture in the casing to mesh in lever locking cam of the exterior handle assembly. The improved lock described above may be configured to operate remote locks.

Conventional entrance lock where the deadlocking latch bolt is operated by lever from either side except when the outside lever is locked by locking lever on inside. When the outside lever is locked, the exterior lever may be operated after unlocking by key or by rotating interior lever which unlocks the exterior lever.

This lock has an outwardly biased latch bolt, an unlatching rocker, a locking member, a cylinder with an exterior key operable barrel and an egress deadlocking slide, a lockable exterior lever and an interior lever each connected by separate shafts to a separate unlatching cam and a locking cam and the spindle passes through the locking cam to mesh with it and then mesh in the lever locking cam of the exterior handle assembly. The improved lock described above may be configured to operate remote locks.

Conventional classroom where the deadlocking latch bolt is operated by lever from either side except when outside lever is locked by key from exterior. When the outside lever is locked, the latch bolt is retracted by rotating the interior lever or by unlocking the exterior lever by key and then operating exterior lever.

The lock has an outwardly biased latch bolt, an unlatching rocker, a cylinder with an exterior key operable barrel and an egress deadlocking slide, a lockable exterior lever and an interior lever each connected by separate shafts to a separate unlatching cam and a the spindle that passes through an aperture in the casing to mesh in the lever locking cam of the exterior handle assembly. The improved lock described above may be configured to operate remote locks.

Conventional F91 lock where the deadlocking latch bolt operated by lever from either side except when both levers are locked by key from either side.

The lock has an outwardly biased latch bolt, an unlatching rocker, a cylinder with interior and exterior key operable barrels, deadlocking slide, an exterior lever and an interior lever each connected to an unlatching cam by a single shaft. The lock electively includes a locking cam, locking member and a spindle that interconnects each to the other.

ALTERNATIVE FUNCTIONALITY and INTEGERS & OPTIONAL FORMS

Bolt

'a) The advanced latch bolt first portion comprises a substantially **prism-like solid 300** as shown in Fig 18

'b) The advanced latch bolt first portion comprises a substantially prism-like solid as shown in Fig 19 that is adapted to be slightly angled inwards on both sides to assist the bolt enter the aperture in the catch plate or strike plate whereby **each side 301** commencing at a position disposed towards the front plate (of the fully extended bolt) slopes inwardly towards the leading end to (over the length of the bolt) reduce the bolt width on each side by length **["wr"]** – this angling of each sides being different from that described below that addresses inwards displacement of the latch bolt during latching. These bolts preferably include at least one a full width **bridge portion 302** within the generally angled sides described above that is defined in-part by two parallel horizontal planes, this bolt being employed with the ramping strike/catch plate described below and/or

'c) The bolt is rectilinearly displaceable as shown in Fig 3, and/or

'd) The advanced latch bolt **leading end 303** is profiled on both sides as shown in Fig 2 (to accommodate both left hand and right hand hinged doors) to facilitate latching wherein the leading portion is chamfered and/or curved, or otherwise profiled on each side to assist latching wherein the latch bolt is engageable on either side by a strike plate to be inwardly displaced by the strike plate during latching, said profiling in some forms comprising a simple radius on the edge defining the junction between the side of the bolt and the outer end of the bolt, and/or

'e) The advanced latch bolt in the fully extended position is extended so far that it could not latch with the strike plate unless it were restrained in the pre-latching configuration, and/or

'f) The advanced latch bolt comprises a substantially prism-like solid having a **slot 310** as shown in Figs 21 to 23, in which is supported at least one and preferably a pair of counter-acting pivotally displaceable hooking arms that are displaced from the bolt as the bolt displaces to the fully extended position. In some forms of this bolt,

there is a **horizontal slot 311** extending from one side to the other and each **hooking arms 312** is supported to be displaceable from a side of the bolt. Each hooking arm terminates at the inner end with a sideways protruding **control shoulder 313** and at the other, outer end in a **hook 314** that is displaceable from within the bolt to protrude from the side of the bolt, to engage behind the **aperture edge 315** within a **catch plate 316** or **strike plate 317** as whereby to become longitudinally engaged. Each arms is supported by a vertical **pin 318** that has passage through an aperture in each arm, said pin defining the vertical pivotal axis of each arm. The hooked arm is configured such that as the bolt displaces towards the fully extended position, each control shoulder is brought into contact with the **inside face 319** of the front plate and as the bolt further extends, the arm is forced inwardly by the front plate aperture edge to displace each hook outwardly – the **front plate aperture edge 320** exerting a moment on each arm to cause it to displace. When the bolt is displaced towards the retracted position from the fully extended and engaged configuration, the strike plate or catch plate aperture edge acts on the hooks (or ramped surface) to displace the hooks into the bolt envelope where they are retained by the front plate aperture edge – the hooked arm being so restrained when the bolt is in the pre-latching configuration and until the hooks have entered the strike plate or catch plate aperture during latching. In other forms, each hook is replaced by a **ramped shoulder 321.**The above-described bolt is suitable for use in locks for both hinged doors when used with a strike plate and sliding doors when used with catch plate. The width **w1**, of the bolt first portion is preferably of reduced width to be less than the width of the bolt return portion **w2** so that the bolt with outwardly displaced control shoulders as shown in Fig can displace within the sides of the casing, and/or

'g) The **corners 330** of the bolt aperture are radiused to provide increased front plate strength and the upper and lower **edges 331** of the bolt are configured to conform to the aperture profile with working clearances.

Bolt

'a) The bolt comprises a latch bolt having a first portion substantially comprises half a solid prism having a **bevel 332** on one side as shown in Fig 20 that extends from top to bottom and from the **leading end 332** of the bolt as is common in bevelled latch bolts and the latch either has or does not require a pre-latching configuration and accordingly either is or is not accompanied by an auxiliary bolt.

'b) The bolt comprises a hand **actuatable bolt 333**, the driver annulus includes the secondary drive shoulder and the unlatching rocker includes the secondary driven shoulder. This bolt comprises a latch bolt as described above and in other

forms the lock comprises a latch bolt as described but without the bolt biasing means.

'c) The bolt spring compression spring (supported between the bolt and rear inside casing wall) acts directly on the second arm of the rocker to outwardly bias the latch bolt by outwardly biasing the second rocker arm. In some locks not including egress, the lock may employ either the compression spring or the torsion spring decribed eslswhere that acts directly on the bolt. To minimize the components types within the lock series it is preferable that the lock employ the torsion spring that acts on the unlatching rocker

Auxiliary bolt

'a) The first auxiliary bolt portion comprises a prism-like member as shown in Fig 2 having a **leading end 340** profiled on both sides to accommodate both left hand and right hand doors wherein the profiled portion on each side is curved, chamfer or otherwise profiled to facilitate latching wherein the auxiliary bolt is engageable on either side by a strike plate to be inwardly displaced by the strike plate during latching, and/or

'b) The auxiliary bolt is outwardly biased by a torsion spring supported about a sideways protruding pin being an extension of a casing fixed portion and the spring has a spring arm that lies behind the sideways protruding pin of the auxiliary bolt to outwardly bias the auxiliary bolt while leading to a moment on the said bolt when it is inwardly retained by a strike plate.

'c) The return portion, has a sideways protruding shoulder preferably comprising a cylindrical **pin** that engages within an aperture of an adjacent **control slide** that is located within the casing adjacent a sidewall to be vertically rectilinearly displaceable. The control slide aperture includes an upwardly **ramped slot** having a lower **ramped edge** that lies in the same vertical plane as the pin. The parts are configured such that as the auxiliary bolt is inwardly displaced the pin along the ramped shoulder to urge the control slide away from the bolt to displace a **control shoulder** of the control slide away from the bolt to enable it to be displaced to the fully extended position by biasing means. The control slide at the leading end has the control shoulder that is engageable in a **edge recess** in the under-edge of the bolt that comprises a horizontally elongated slot extending from a substantially **vertical slot end** towards the outer end of the bolt – preferably the slot does not extend sideways to the surface of the bolt. The ramped slot is also defined in-part by a upper **ramped edge** that lies in the same vertical plane as the pin. The parts are configured such that as the auxiliary bolt is outwardly displaced the pin slides along the upper ramped shoulder to urge the control slide towards the bolt to displace the control shoulder of

the control slide towards engagement with the bolt. In some forms of locks the aperture in the control slide includes a substantially **horizontal elongation** to accommodate additional displacement of the auxiliary bolt. In normal usage, the bolt is fully retracted by unlatching lever operation and the wing is opened whereby to enable the auxiliary bolt to outwardly displace till it is restrained by the control slide itself restrained by abutting the bolt. As the unlatching lever is then reversed towards the undisplaced position, the bolt outwardly displaces during which displacement the control shoulder is displaced by the auxiliary bolt into the under-edge recess to restrain the bolt in the pre-latching configuration.

Cylinders

'a) In some locks the **first cam 350** has a radially protruding **first cam arm 351** is supported within the casing by the casing sides as described in [Watts AU 696343] to be operable by a barrel supported within a handle assembly, herein being included by reference.

'b) In some locks, the cylinder comprises a fixed cam cylinder, the first cam is operated by being rotated 360 degrees and in locks employing such cylinders, the lock does not include the locking lever, locking cam and the first cam is given space to fully rotate. In this case during locking, the first cam leaves the drive recess, passes over the exit face and comes to rest in the initial undisplaced position enabling key removal. In this case, the spring-loaded ball is engageable in recesses corresponding to an undisplaced slide and a slide in the first locked configuration.

'c) In some locks, the cylinder comprises a **single cylinder**

'd) In some locks, the cylinder comprises a **free-rotation-double-cylinder 352**

'e) In some locks, the cylinder comprises a free-rotation-cylinder that is connected on one side to a hand operable member on one side that comprises an operable knob.

'f) In some locks, there is an exterior locking lever, as described in [Watts AU 18474/2000] that hereby included by reference, that is operable to displace the lock into the second locked mode but which is not operable to displace the lock from the second locked mode.

Lever operated automatic deadlatching lock

'a) In some deadlatching locks, the deadlaching deadlocking slide comprises a deadlocking slide similar to the common deadlocking slide but biased by compression **spring** towards the third locked configuration slide by a spring within a vertically elongated **spring recess**. This deadlocking locking slide has a horizontally elongated **ramped shoulder** projecting towards the alternative auxiliary bolt that includes a horizontal **engageable face.**

The auxiliary bolt is similar to the auxiliary bolt described above but has a rearwardly projecting **blade portion** that passes beside the alternative deadlocking slide and that has a horizontally elongated **ramped shoulder** projecting towards the deadlocking slide with a horizontal **engageable face** projecting towards the alternative deadlocking slide. The alternative auxiliary bolt is outwardly biased by the **torsion spring** supported about the sideways protruding **pin** being an extension of a casing fixed portion - this means of biasing the auxiliary bolt can also be applied to all the locks described above. The spring has a **spring arm** that lies behind the sideways protruding pin of the alternative auxiliary bolt. The blade is biased and displaceable towards the alternative locking slide as a result of the auxiliary bolt being restrained against outward displacement by contact with the strike plate while a side of the alternative auxiliary bolt is urged by the spring arm – this arrangement giving rise to a moment that causes the auxiliary bolt to be urged towards the alternative deadlocking slide – because the spring arm is on the opposite side of the auxiliary bolt from the blade portion

The lock is configured such that in the pre-latching configuration, the engageable face of the alternative locking slide is above the engageable face of the alternative auxiliary bolt and the alternative locking slide abuts the bolt to be restrained by the bolt. When the wing is closed the bolt is displaced to the fully extended position and the alternative deadlocking slide is displaced to the second locking configuration while the alternative auxiliary bolt is retained depressed. In this locked configuration the alternative locking slide lies behind the bolt to deadlock the bolt such that it cannot be retracted by lever operation and the alternative auxiliary bolt is depressed.

When in the second locked configuration, either the (cylinder - if included) or (locking lever - if included) can be operated to displace the alternative deadlocking slide to the undisplaced position during which displacement the ramped engageable horizontal face of the deadlocking slide passes over the ramped engageable horizontal face of the alternative auxiliary bolt by displacing the blade of the alternative auxiliary bolt sideways, after which the blade portion of the auxiliary bolt displaces towards the alternative locking slide to engage the said slide and retain it until such time as the alternative auxiliary bolt is depressed. When the auxiliary bolt displaces to the fully extended position as occurs when the wing is opened, the ramped engageable horizontal face of the auxiliary bolt displaces outwardly from above the ramped engageable horizontal face of the alternative locking slide to thereby release the slide to assume the position corresponding to the pre-latching configuration where the alternative deadlocking slide abuts the bolt

Driver and connection to remote locks

'a) The first and second joints in one form comprise pin joints comprising a pin extending sideways from one member to locate within the other member or a pin that extends from within apertures in each member to be relatively displaceable to at least one. Preferably, the first and second joints are an equidistance (by a radius r) from the driver annulus pivotal axis and on opposite sides of the pivotal axis and preferably the first and second joints are in the same horizontal plane when the driver is angularly disposed half way between the undisplaced and fully displaced positions.In other forms, the joints comprise sideways protruding pins of the driver annulus that extend into substantially horizontal slots of the drive slides.

'b) A **lower secondary slide** is included to be connected to the lower drive slide to facilitate connection to a lower vertically elongated drive member. In one form, the lower secondary slides comprises a screw-like threaded **fitting 350** that can receive and mate with an internally threaded end of a lower rod or tube. In some forms the lower drive slide extends vertically (within a **casing channel 351**) along the inside wall of the casing to pass through an **aperture 352** in a **horizontal wall 353** disposed towards the lower end of the casing whereupon to **dog-leg 354** so as to have the end portion halfway between the casing sides and this end portion mates within a central **axial recess 355** of a substantially cylindrical end fitting that is threaded **externally 356.**

Similarly, in some forms of locks, there is included an **upper secondary slide 357** connected to the upper drive slide to facilitate connection to an upper vertically elongated member that is connected to an upper remote lock, said upper secondary slide in one form comprising a screw-like threaded **fitting 358** that can receive and mate with an internally threaded end of an upper rod or tube. In some forms the upper drive slide extends vertically along the inside wall of the casing to pass through an **aperture 359** in a horizontal **wall 360** disposed towards the upper end of the casing whereupon to **dog-leg 361** so as to have an end portion halfway between the casing sides and this end portion mates within a central axial **recess 362** of a substantially cylindrical end fitting that is threaded externally. In forms of the invention, the end fittings are within the casing when the driver member is undisplaced.

In some forms, the drive members comprises hollow tubes and the screw-like threaded fittings comprise **cylindrical members 363** connected to a **disc-like portion 364** of larger diameter that is **slotted 365** to receive the orthogonal (dog leg) portion of a drive slide and that has a axial aperture to receive the end portion of a drive slide, the slot restraining the fitting against rotation as the tube is wound onto

the outer threaded portion of the cylindrical portion. The cylindrical portion is preferably connected to a **cone portion 366** through which the axial aperture extends. In other forms, the fitting comprises a cone portion having an axial aperture connected to a cylindrical member having an axial aperture to receive the end portion of a drive slide and an orthogonal side aperture to supported an outwardly biased pin that is displaceable to project into an aperture in the side of the tube whereby to become partly within both apertures whereby to connect the tube to the fitting.

The axial aperture within the cone is preferably connected at the **point 367** to a flexible elongated fitting member (in some forms comprising a **cord 368**) that can be inserted into the door along the path that it is intended to fit the tube and to extend from the wing a sufficient distance to enable the tube to be threaded onto the cord. The cord when pulled tight is then used to guide the tube into engagement with the threaded fitting by being slid along the tensioned cord.

In locks where the remote locks are connected to the main lock by Bowden Cables and the cables operate in the same direction, the lower inner cable is preferably connected by an **alternative first joint 369** that is on the opposite side of the drive member from the first joint and is substantially co-axial with the first joint; the upper inner cable being connected by the first joint; these joints comprising a return portion of the inner cable within an aperture in the driver annulus that takes the place of the pin described above. In these forms, the internal fixed portions of the casing are adapted to provide an **open channel 370** (open from the rear of the casing) extending from the driver member to the lower end of the casing to provide passage for the lower Bowden Cable. Adjacent to the driver member there is a **receiving portion 371** of the casing comprising a **slotted aperture 374** to receive and restrain the **end 372** of the **lower outer cable 373**.

Similarly, the **upper inner cable 374** is preferably connected to the **first joint** and the internal fixed portions of the casing are adapted to provide a **receiving portion 377** to accommodate and restrain the **end 378** of the lower outer cable.

In some locks, the Bowden cable as shown in Fig 24 comprises an inner **flexible cable 382**, within a **rigid tube 383** while in other cases the outer cable is a **flexible 384**. In some locks, the inner cable comprises a single strand of wire and in other it comprises multiple strands.

Strike/catch plate

'a) In some locks, the strike/catch plate includes a substantially rectangular aperture as elsewhere described having a width substantially the same as the bolt (plus operating clearance) but further including an additional **clearance aperture 390** shown in Fig 25 extending exteriorly from the aperture and in a position adjacent

each bridge described in Bolt b) above. The clearance apertures extend horizontally for a distance not less wr defined above and for a vertical height not less than the height of the bridge plus the vertical clearance between the aperture and general bolt. This configuration enables the bolt of a lock in a partly open wing to latch whereby to enter the aperture when a hinged wing is partly open. This functionality pre-disposes a bolt to be driven outwardly by deadlocking slide displacement and/or by actuation of the driver annulus as described above. These forms of integers find application in wings that must be closed against a seal and that require a force to be applied to fully close the wing. In usage the wing would be closed by hydraulic closer or by hand to cause the bolt to latch and the unlatching lever would then be lifted to actuate the bolt and drive remote engaging members to the operative position.

'b) In some locks, the strike plate comprises an improved **strike plate 400** as shown in Fig 25 that comprises a substantially conventional strike plate having a **wing 401** to facilitate latching, an **aperture 402** to provide passage for the bolt and upper and lower portions that are attachable (usually by screws) to the element defining the opening, said aperture may extend to one or more clearance apertures.

The aperture of the improved strike plate includes a **front edge 403** against which the bolt is urged when the door is urged in an opening direction as occurs when one attempts to force open a locked door. The substantially conventional strike plate in preferred forms, is modified to resist jemmying by enabling the portion of the strike plate adjacent the front edge to be displaced with the bolt while the portions attached to the opening remain attached to the opening while being subjected to forces that tend to pull the strike plate away from the opening and that urge the fixing screws to pull out, however the further modified strike plate subjects the screws to considerably lower forces than are applied by a conventional strike plate. The aperture of this strike plate are within a substantially flat **plate-like portion 404** extending from between a **lower slot 405** to an **upper slot 406** and connected to the strike plate **wing 407** that preferably comprises an angled or curved wing and each said slot extends from the **rear edge 408** to pass between the screw aperture and aperture and preferably each slot further extends to include a **vertical portion 409** between the screw aperture and wing. Importantly, the front edge of the aperture is within a portion of the strike plate that is connected to the wing so as to be displaced with the wing.

The strike plate wing is connected by **bridges 410** of reduced cross-sectional area and the strike plate is of a deformable material enabling these bridges to deform without cracking and the reduced areas enables deformation to occur at reduced forces – these characteristics enabling the wing to be angularly displaced about a

deformation axis 412 that passes substantially through each bridge. If forms where the front edge is rearwardly disposed relative to this deformation axis, rotation of the wing causes the front edge to be displaced towards the wing and bolt to bring the bolt into closer engagement with the strike plate. When a jemmy blade rests on the strike plate wing as it is rotated to part the wing from the opening, the blade angularly displaces to deform the bridges and to cause the wing to rotate about the deformation axis.

The **upper and lower extremes 413** of the plate-like portion (that portion between the apertures and the slots) are of reduced cross-sectional area to enable these portions to deform under low forces so as to deform as the blade portion angularly displaces about the deformation axis. When these portions are caused to engage the face of the lock they deform so as not to inhibit the displacement of the wing about the deformation axis.

The bridges connect to **fixable portions 414** that include **screw apertures 415** through which screws shanks have passage and by which the fixable portion is attached to the opening. In some types of deformation the fixable portions angularly displace about the screw to reduce the effective distance between bridges, and this feature combined with the fact that the wing is attached only at each to a bridge enables the wing and front edge to deform like a bow and at comparatively moderately low forces to thereby enable the front edge to displace with the bolt while the fixable portions remain attached to the opening while being subjected to reduced loads that urge the screws to pull out of the opening.

In common forms of jemmy attack, when a closed and locked door is urged open under the action of a jemmy blade placed adjacent the bolt, the bolt is forced against the front edge while the lock is simultaneously displaced away from the strike plate and as a result, the bolt (in part, as a result of friction between the bolt and front edge) causes the strike plate to deform to enable the front edge to displace with it.

Some Claims defining the Invention Are:

'1 A lock including a casing, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing and operating means by which to displace the bolt towards the retracted position including a hand operable lever operably connected to the bolt by angularly displaceable means comprising an angularly displaceable unlatching rocker having an upper arm operably associated with the lever and a lower arm operably connected to the bolt.

'2 A lock according to Claim 1, where the bolt is an advanced bolt

'3 A lock according to Claim 1, including a deadlocking slide, a cylinder and locking member wherein the bolt is deadlockable by the deadlocking slide to restrain it from displacing to the retracted position and the lock is lockable by the cylinder to restrain it from being unlocked by the locking member, said locking restraining the deadlocking slide from displacing from the deadlocking configuration.

'4 A lock according to Claim 1, including an angularly displaceable driver operably connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,

at least one hand operable angularly displaceable lever having a free end and at least one angularly displaceable unlatching cam to operably connect the bolt and driver to the at least one lever,

wherein the bolt is displaceable towards the casing by downward displacement of the free end and each connected drive member is displaceable towards and away from the casing by displacement of the free end.

Exterior handle locking – and adapted dead locking slide

'10 A lock including a casing, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

operating means by which to displace the bolt towards the retracted position including an exterior and an interior hand operable lever operably connected to the bolt by angularly displaceable means,

an adapted dead locking slide and a hand operable locking member that is operable to displace the said adapted locking slide, said adapted dead locking slide being displaceable by the locking member to a third locked configuration corresponding to the exterior lever being locked to be restrained against displacement,

said adapted dead locking slide being displaceable from the third locked configuration to unlock the exterior lever by displacement of the interior lever.

'11 A lock according to Claim 10 wherein the angularly displaceable means comprises an angularly displaceable unlatching rocker.

'12 A lock according to Claim 10, wherein the bolt is rectilinearly displaceable

'13 A lock according to Claim 10, where the bolt is an advanced bolt

Automatically locking lock

'20 A lock including a bolt comprising a latch bolt having an alternative associated auxiliary bolt supported in the casing, said bolt being displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

operating means by which to displace the latch bolt towards the retracted position including an angularly displaceable unlatching rocker operably associated with an exterior and interior hand operable unlatching lever,

deadlocking means to restrain the latch bolt in the fully extended position including a common deadlocking slide biased towards the bolt, a cylinder including a key operable barrel that is operably connected to the common deadlocking slide, and a locking cam operably associated with the common deadlocking slide,

said common deadlocking slide being displaceable to the undisplaced position by the cylinder during which displacement the locking cam is actuated to a position in which it engages the deadlocking slide to restrain from being displaceable to engage the bolt, said locking cam being subsequently displaceable to release the said deadlocking slide to abut the bolt in preparation for latching and automatic deadlocking.

'21 A lock according to Claim 20, wherein the bolt is an advanced bolt

Automatically locking lock – unlatchable by exterior cylinder

'30 A lock including a bolt comprising an advanced latch bolt supported in a casing, said latch bolt being displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

deadlocking means to restrain the latch bolt in the fully extended position including an unlatching deadlocking slide that is biased towards the latch bolt,

operating means by which to displace the latch bolt towards the retracted position including an angularly displaceable unlatching rocker operably connected to the unlatching deadlocking slide,

the cylinder being operable to displace the deadlocking slide to the undisplaced position during which displacement the bolt is freed to inwardly displace and the unlatching rocker is displaced to retract the bolt.

'31 A lock according to Claim 30, wherein the angularly displaceable unlatching rocker is operably connected with free movement to the unlatching deadlocking slide by a modified unlatching cam operably connected to the unlatching deadlockiung slide by a link member.

Driver to operate remote bolts

'41 A lock including a casing, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

an angularly displaceable driver operably connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,

at least one hand operable angularly displaceable lever having a free end and at least one angularly displaceable unlatching cam to operably connect the bolt and driver to the at least one lever,

wherein the bolt is displaceable towards the casing by downward displacement of the free end and each connected drive member is displaceable towards and away from the casing by displacement of the free end.

'42 A lock according to Claim 41, wherein the pivotal axis of the diver and unlatching cam are closely disposed

'43 A lock according to Claim 41, wherein the diver comprises a substantially annular member.

'44 A lock according to Claim 41, wherein the bolt is outwardly displaceable by actuation of the driver annulus

'45 A lock according to Claim 1, wherein the bolt is an advanced latch bolt

Cylinder displaces driver

'50 A lock including a casing with sides, a bolt supported in the casing to be displaceable between a fully extended position where the bolt protrudes from the casing and a retracted position in which it is substantially within the casing,

an angularly displaceable driver operablely connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,

deadlocking means by which to restrain the bolt in the fully extended position including a key operable cylinder and a deadlocking slide that is connected by a deadlocking slide extension to the driver,

said deadlocking slide being displaceable by the cylinder to displace the driver whereby to displace each connected drive member towards and away from the casing.

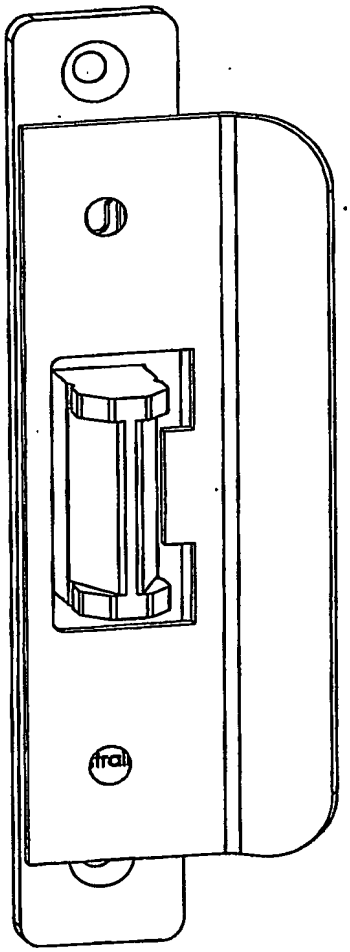
'51 A lock according to Claim 50, wherein the bolt is an advanced bolt

Fixed door lock

'60 A lock including a casing having a front plate, an angularly displaceable driver operablely connectable to an upper remote engaging member by an upper vertically elongated drive member and/or connectable to a lower remote engaging member by a lower vertically elongated drive member,

at least one hand operable angularly displaceable lever having a free end and at least one angularly displaceable unlatching cam to operably connect the driver to the at least one lever, each connected drive member being displaceable towards and away from the casing by displacement of the free end,

said lock further including a locking plunger that protrudes from the front to be displaceable to engage in a recess in the driver whereby to restrain the driver against displacement.



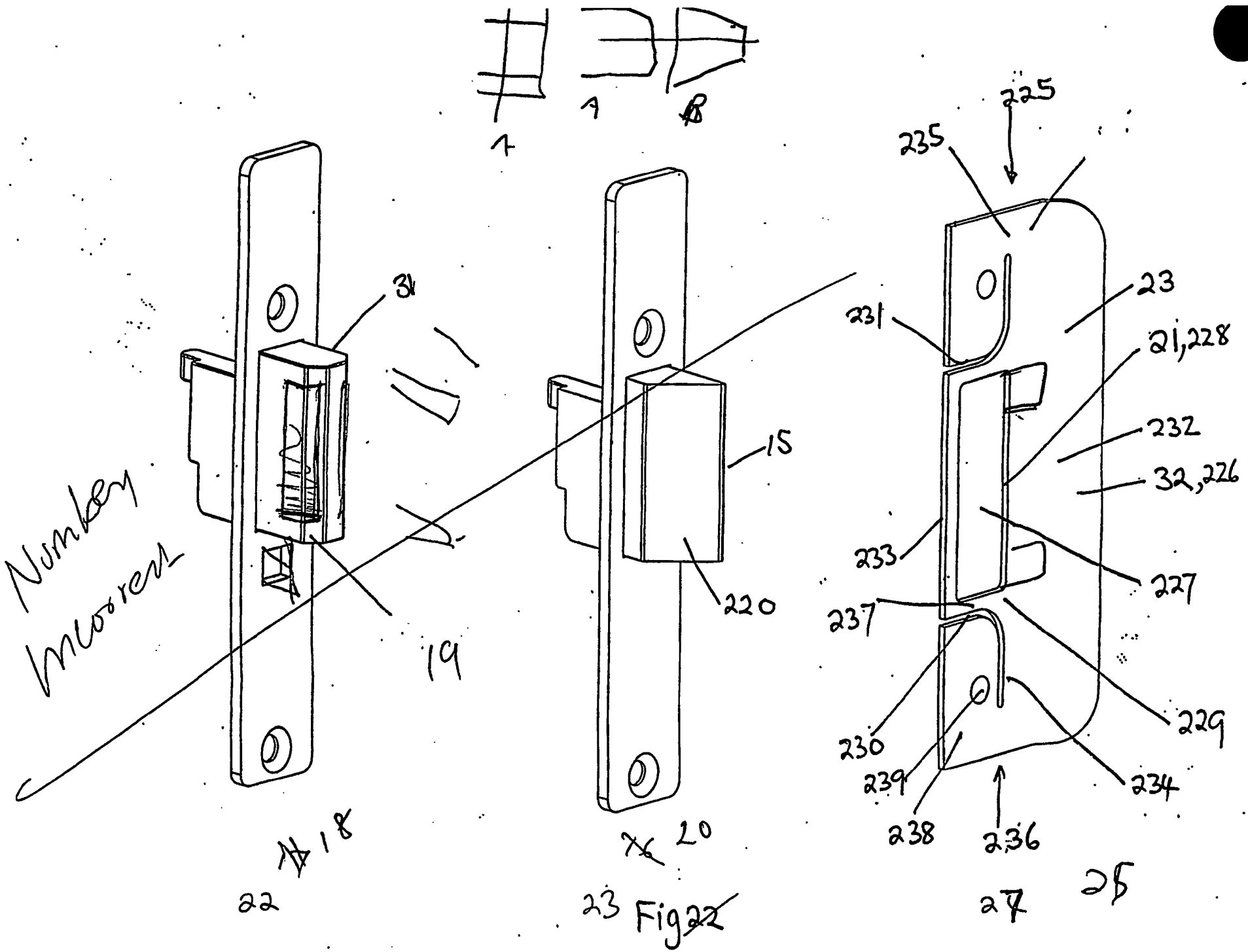

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Fig 22

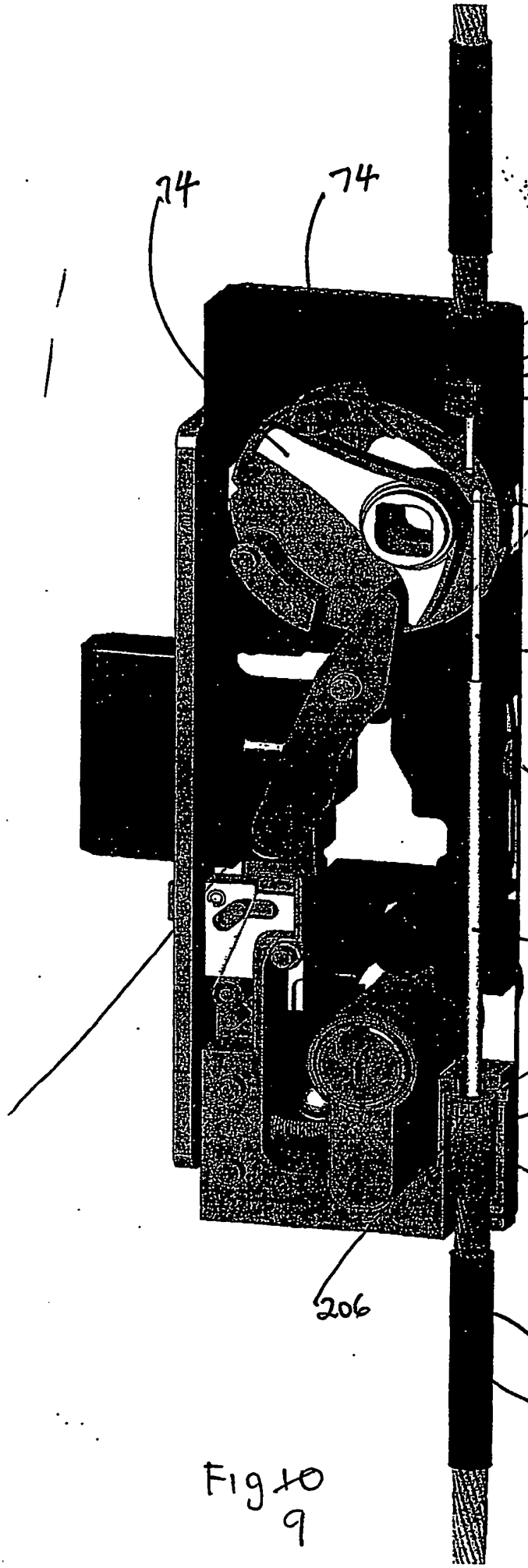

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Fig 10
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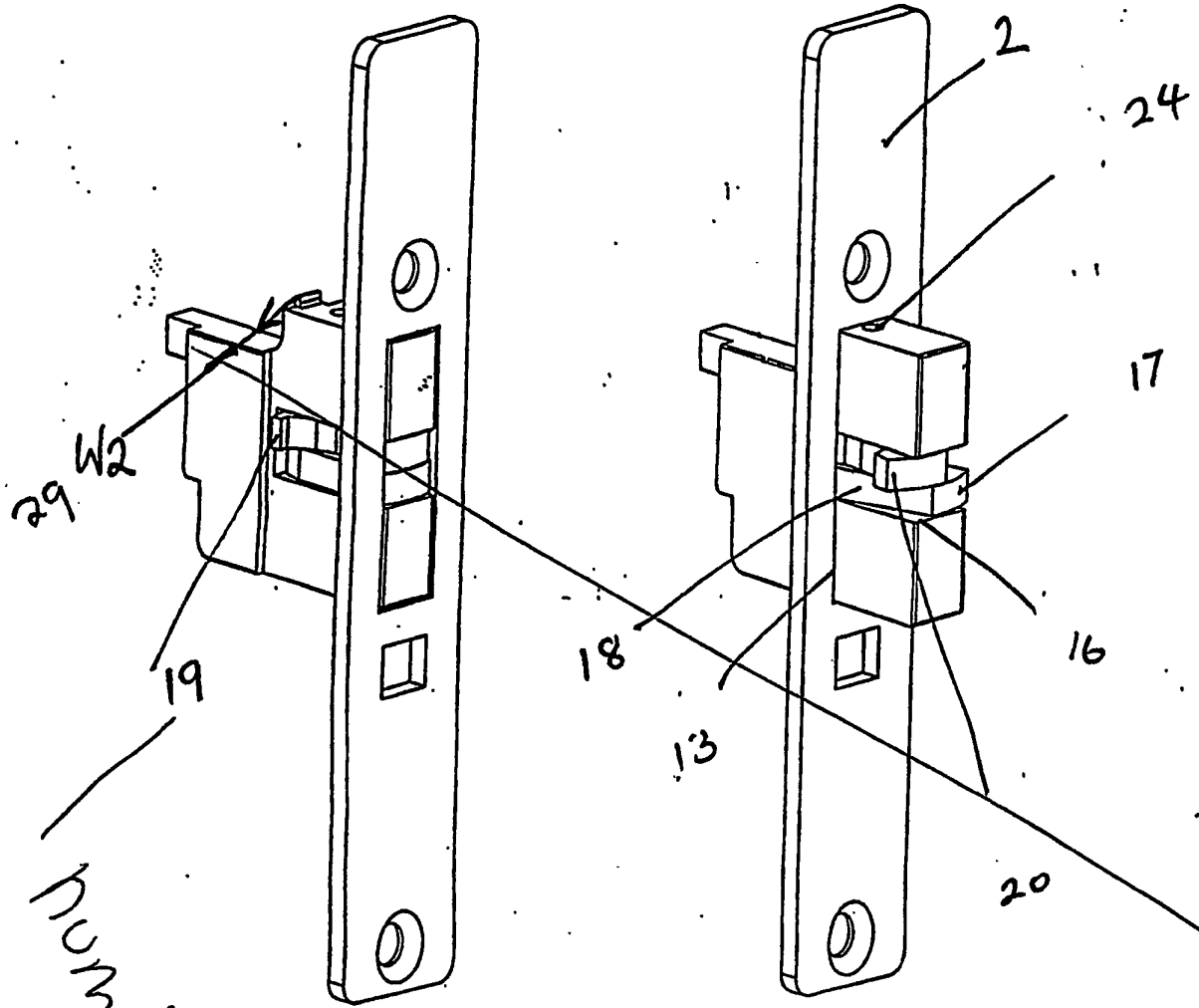

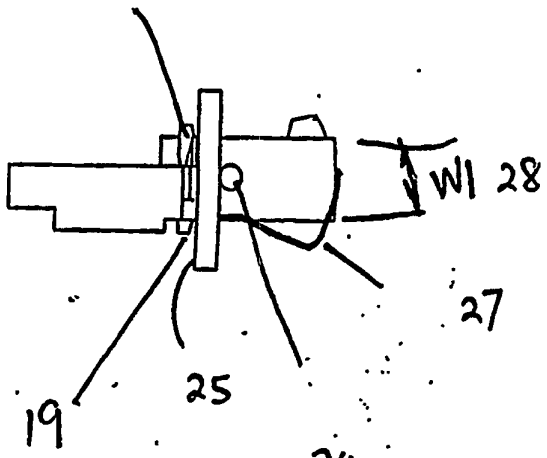

Fig 21

Fig 22

Fig 23

numbering correct

Fig 24

Fig 25

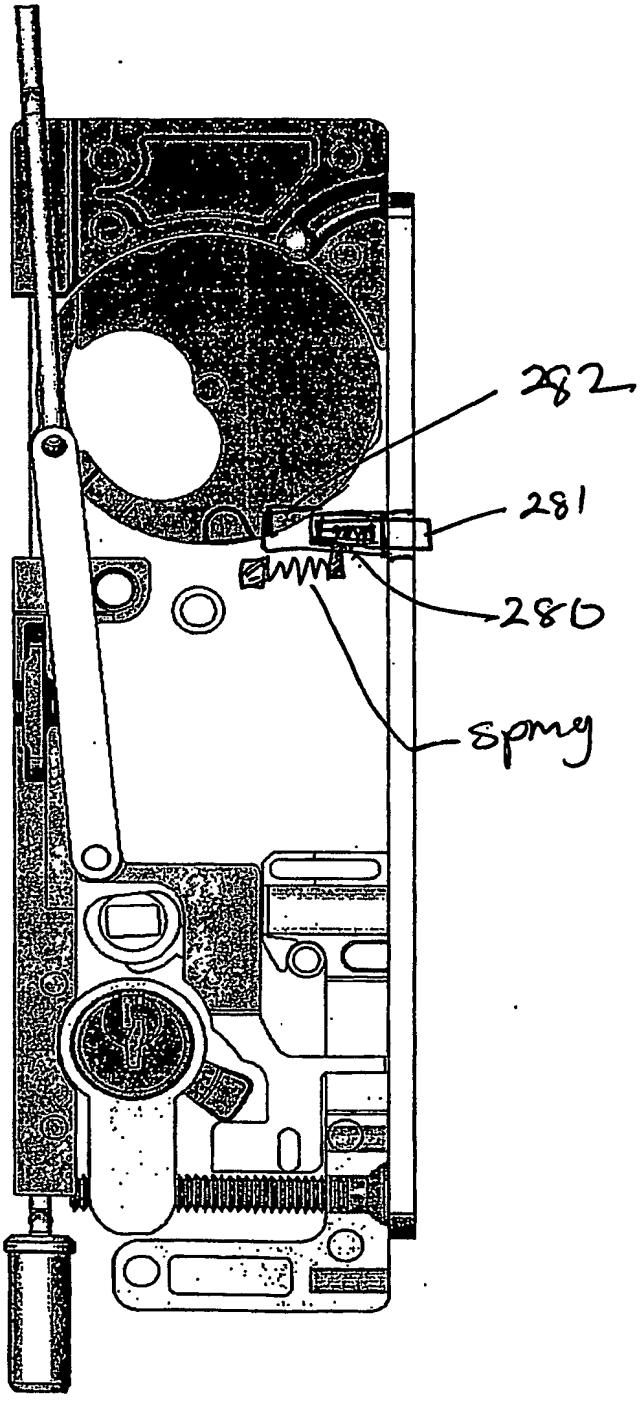

Fig 17

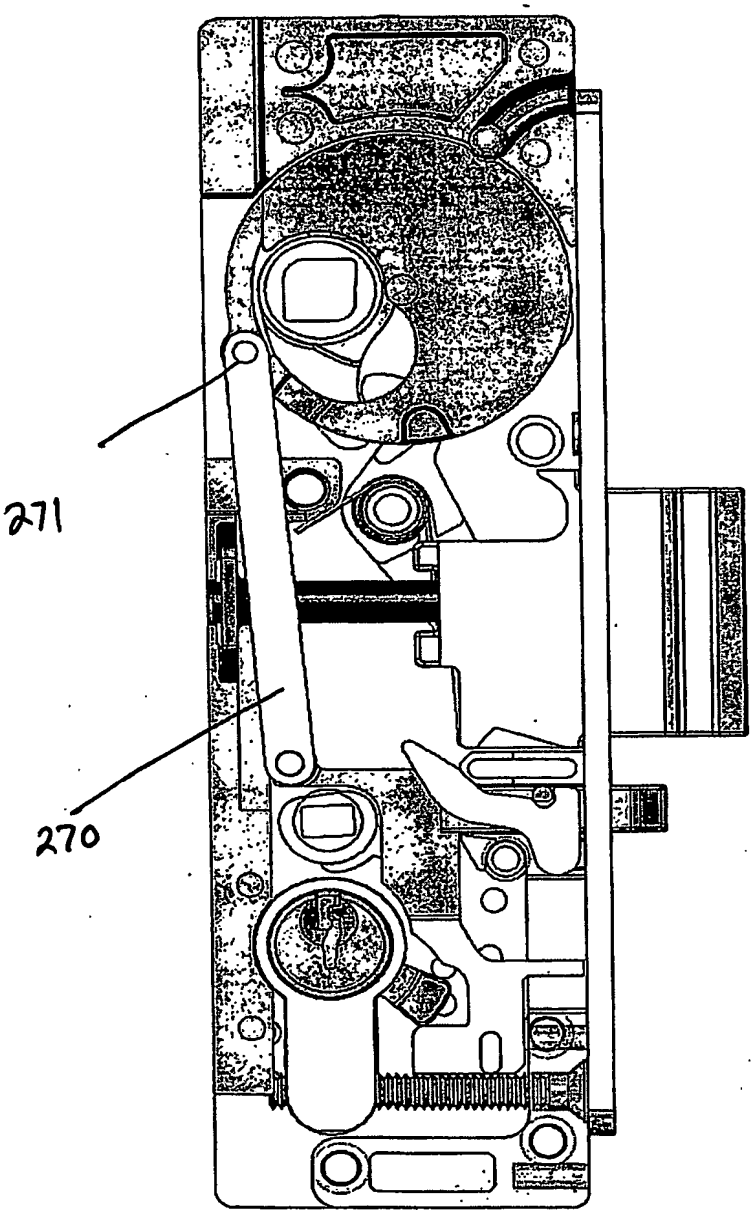

Fig 16

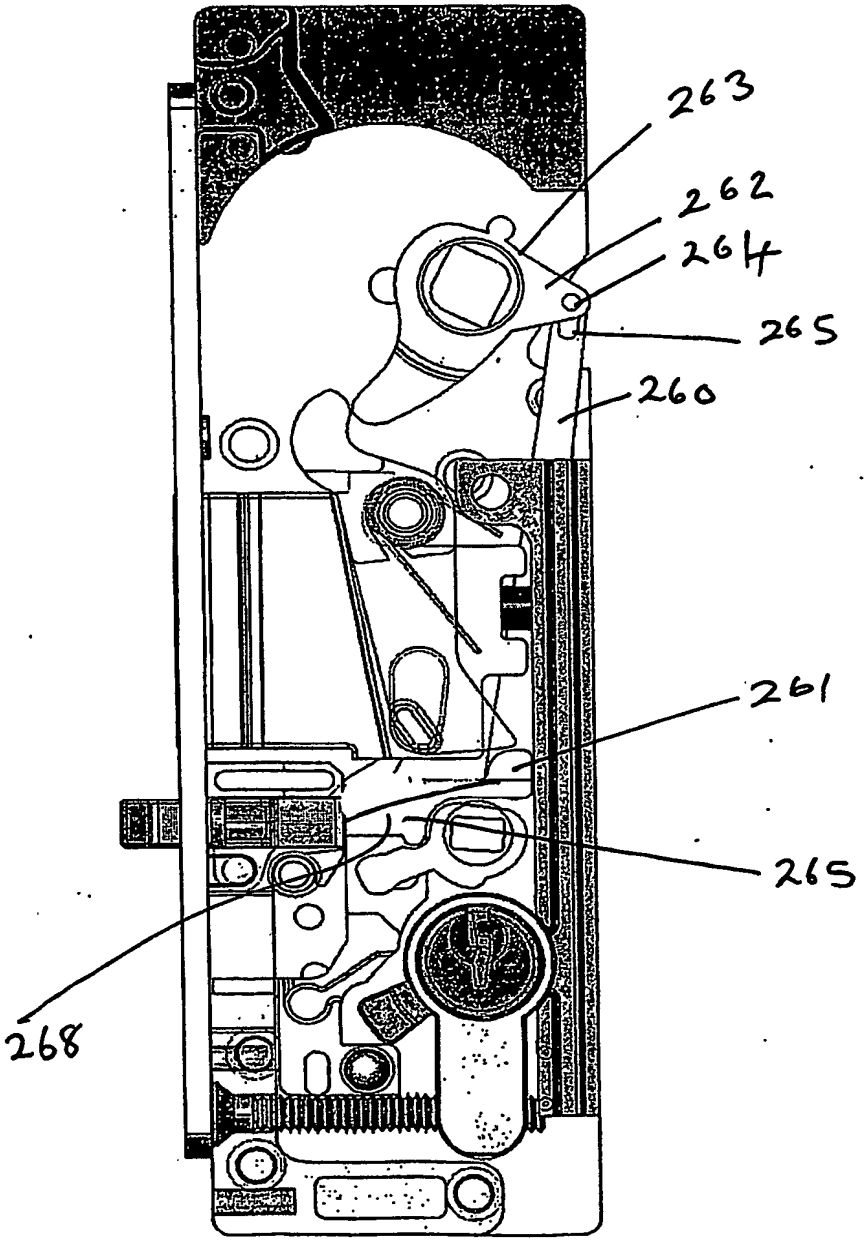

Fig15

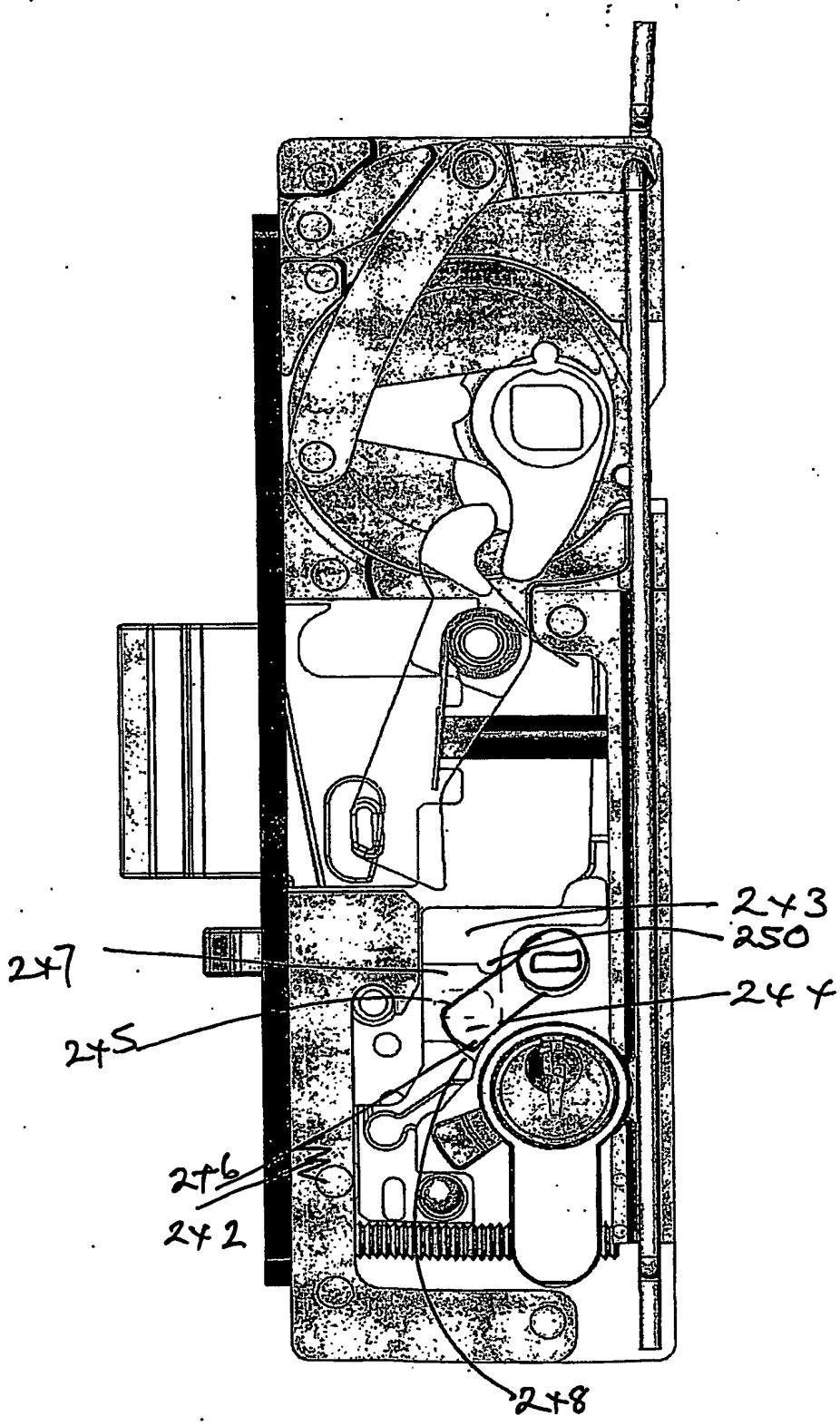

Fig 14

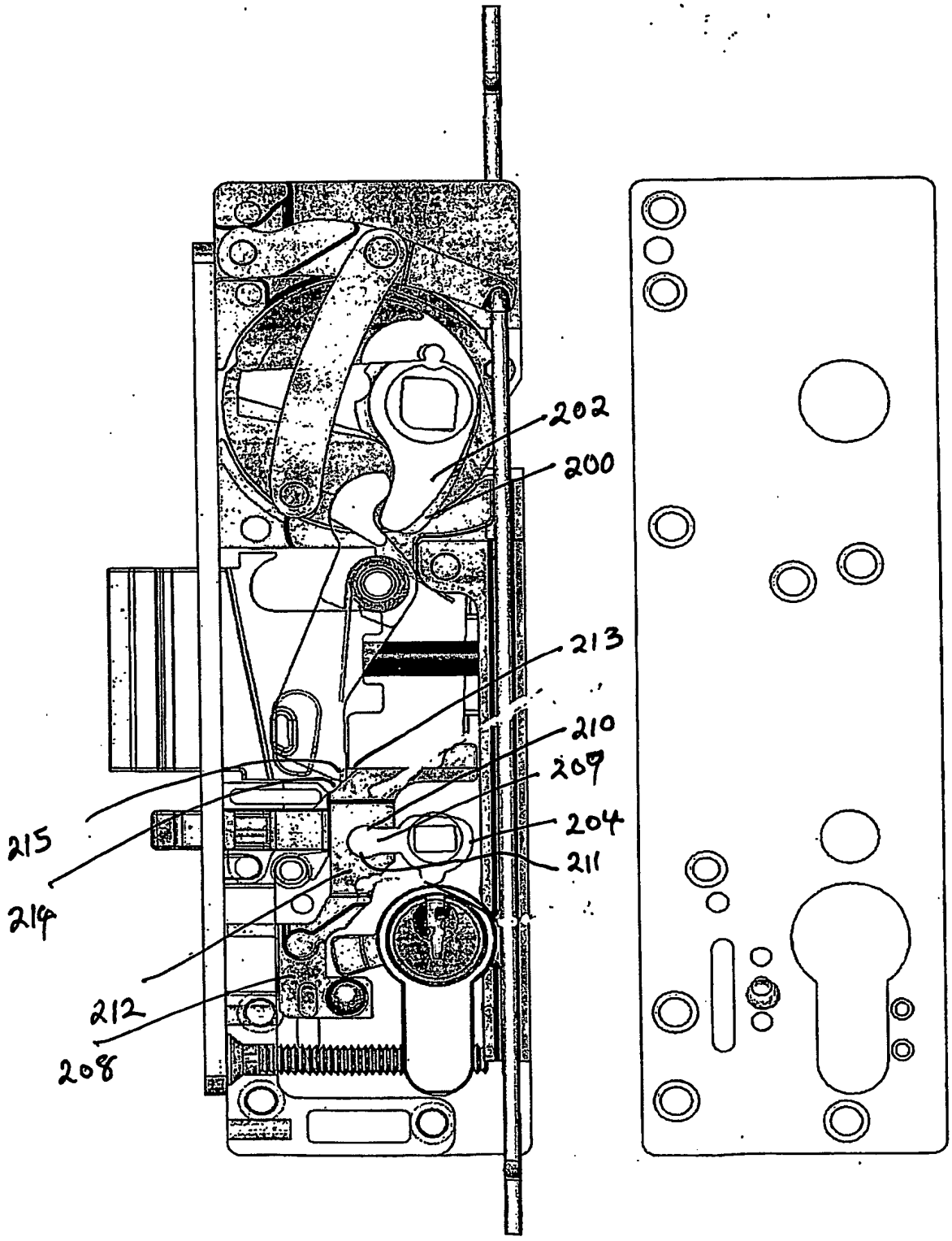

Fig 12

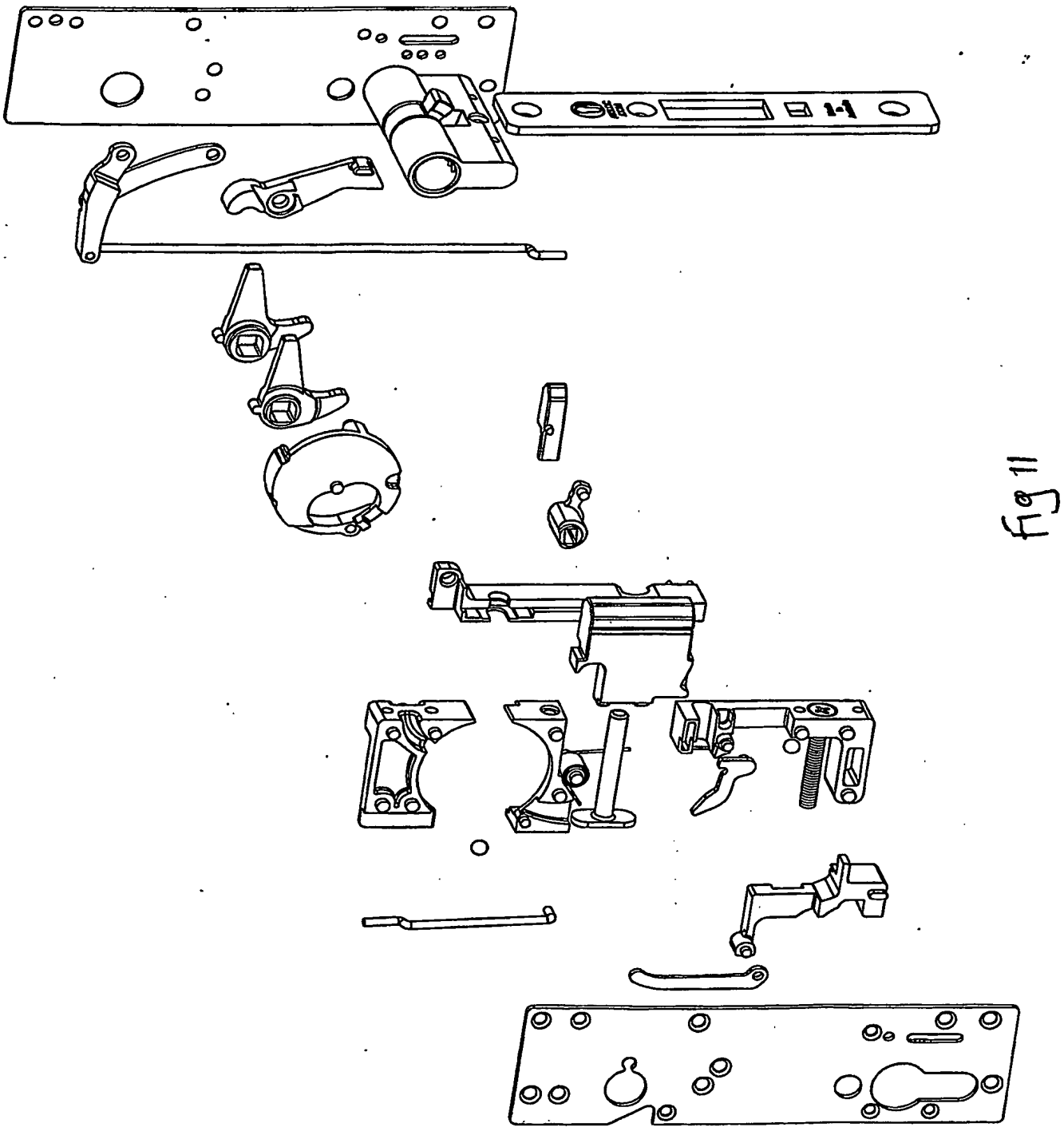

Fig 11

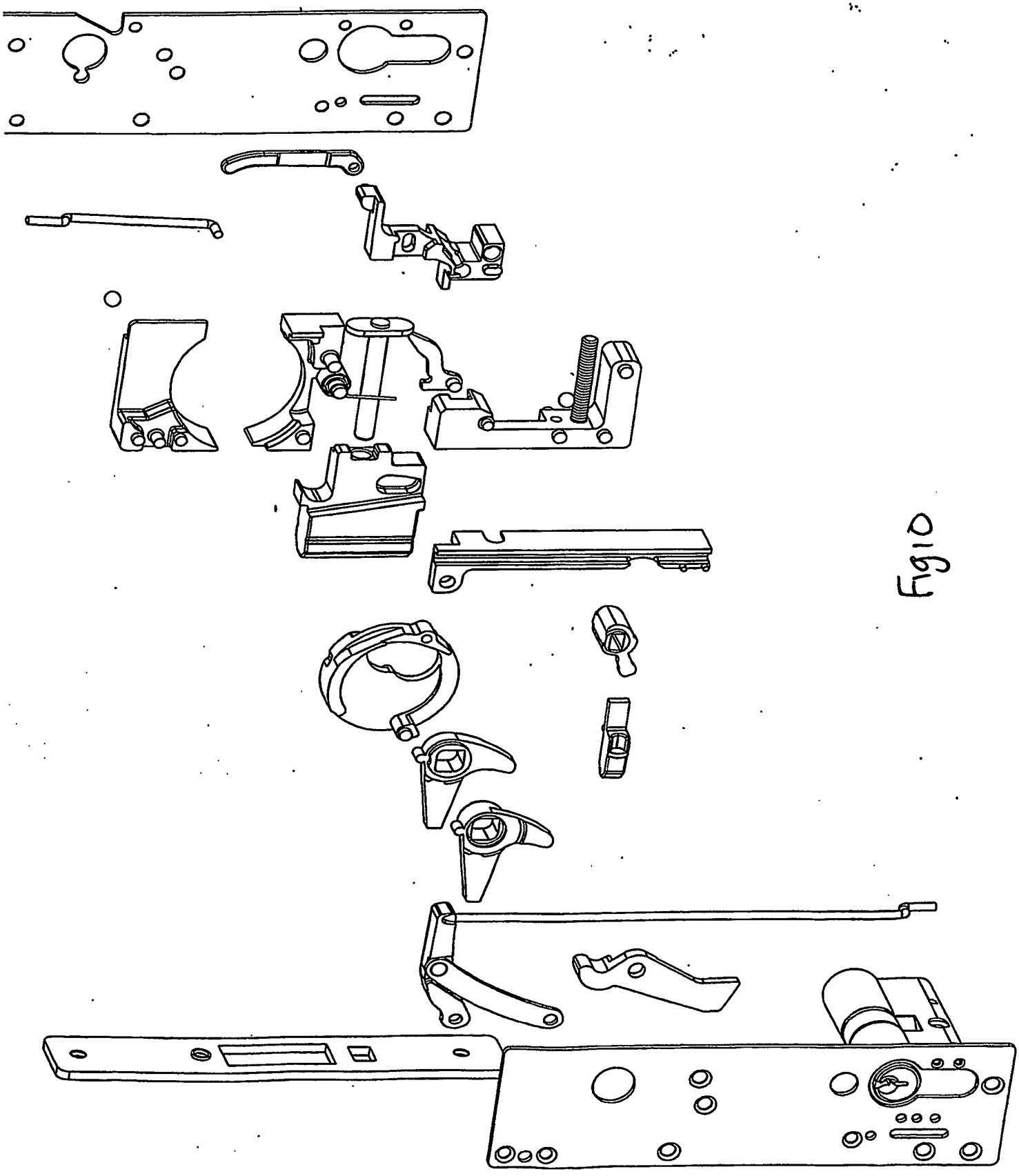

Fig 10

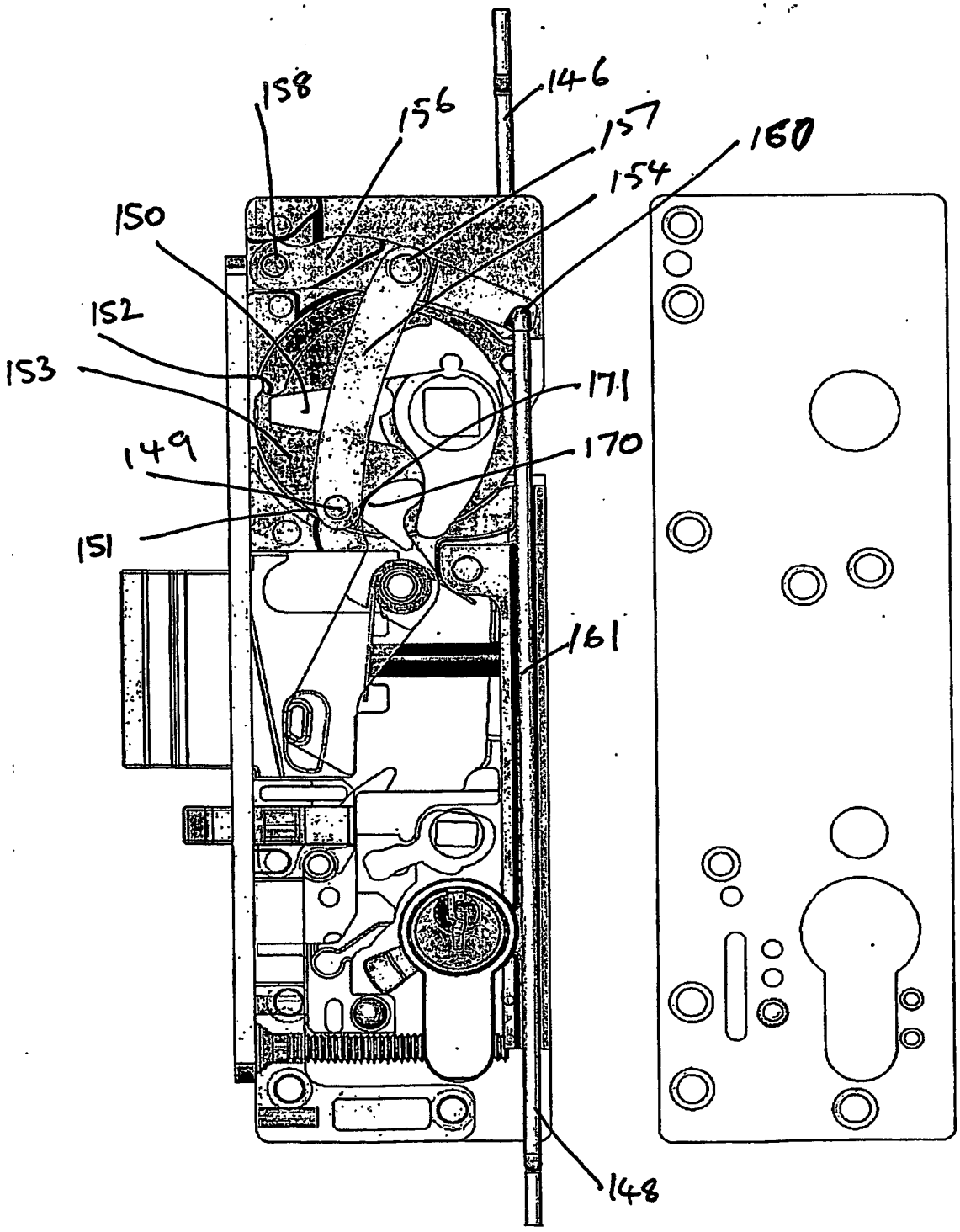

Fig 9

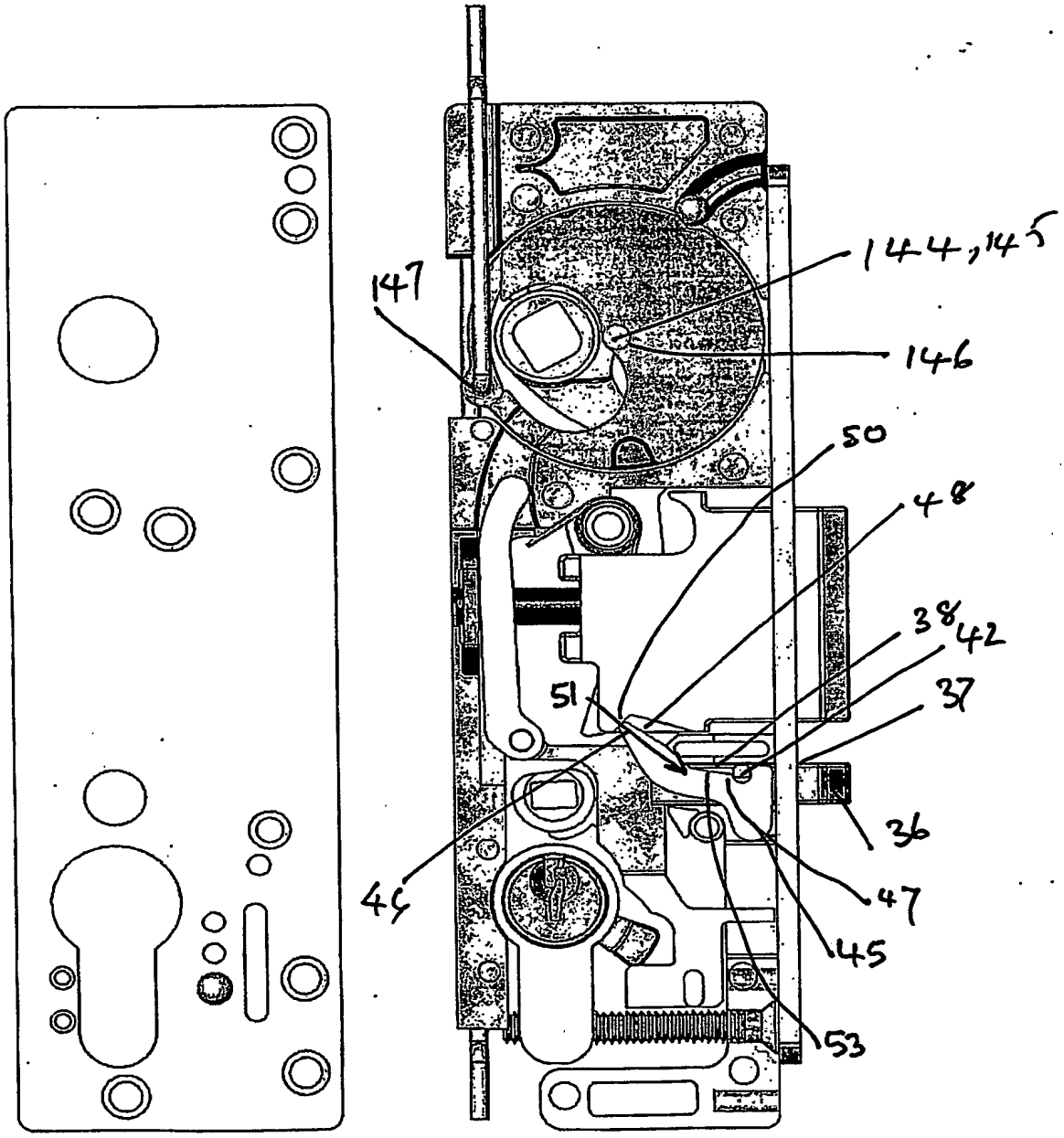

Fig 8

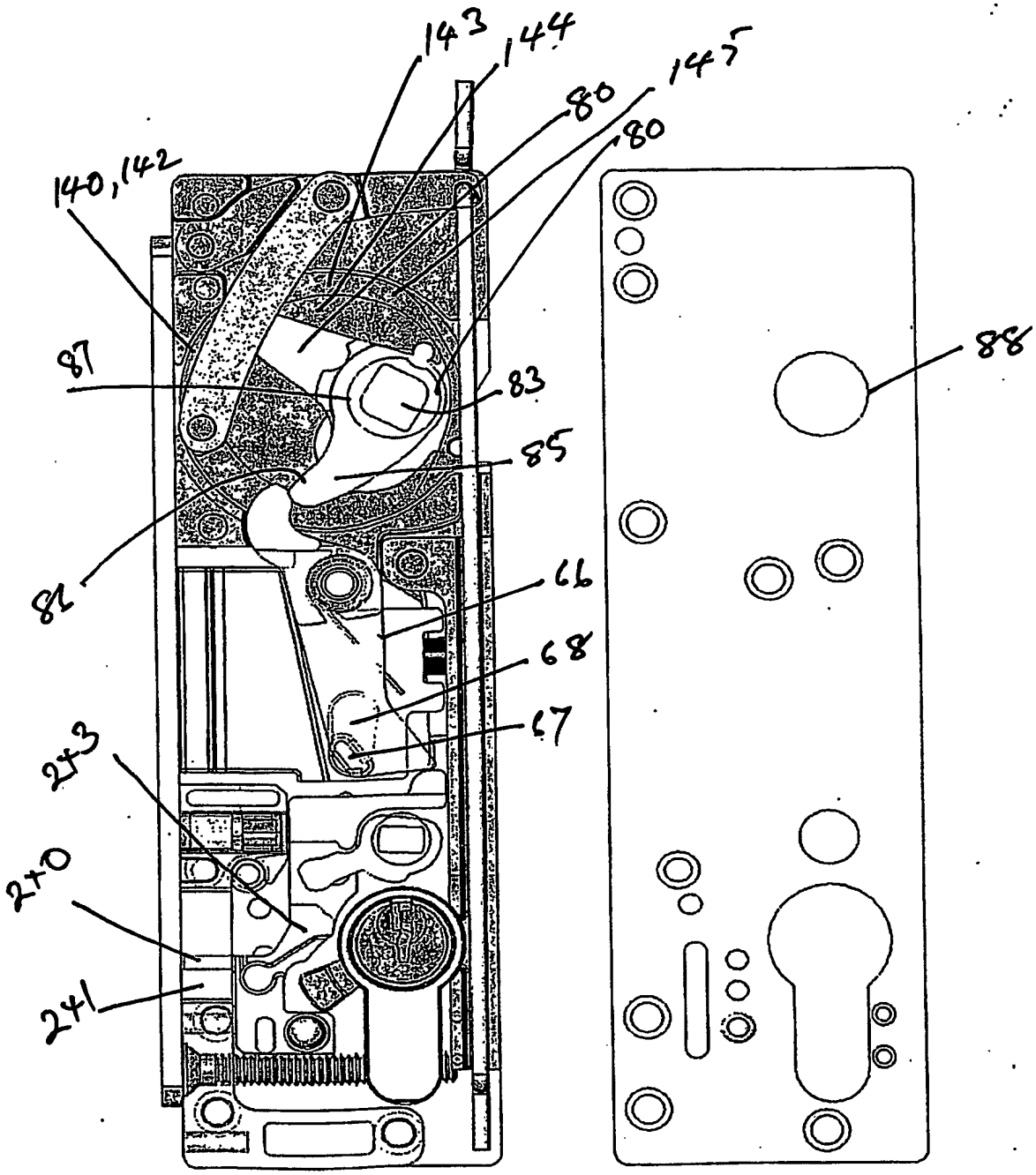

Fig7

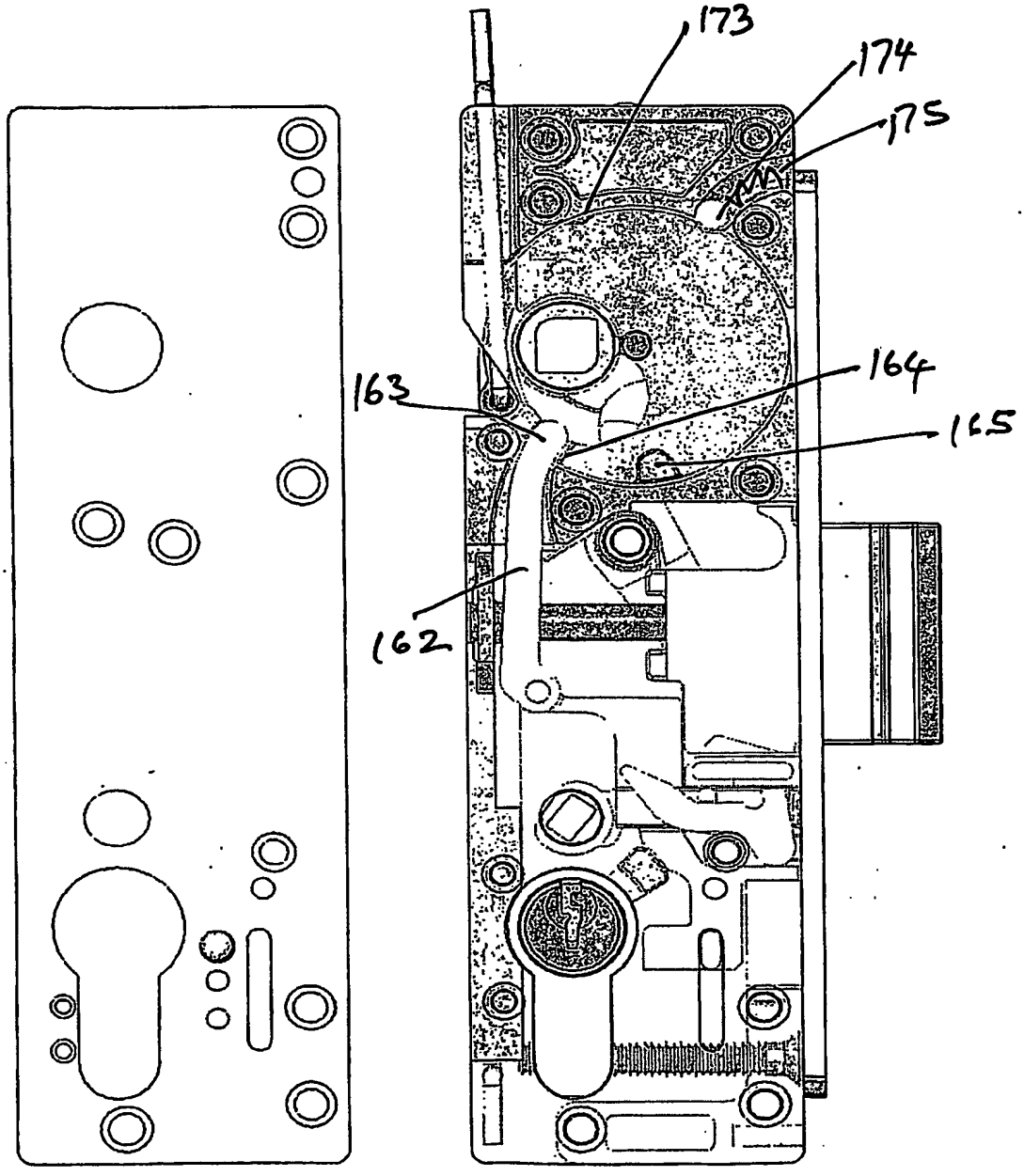

Fig 6

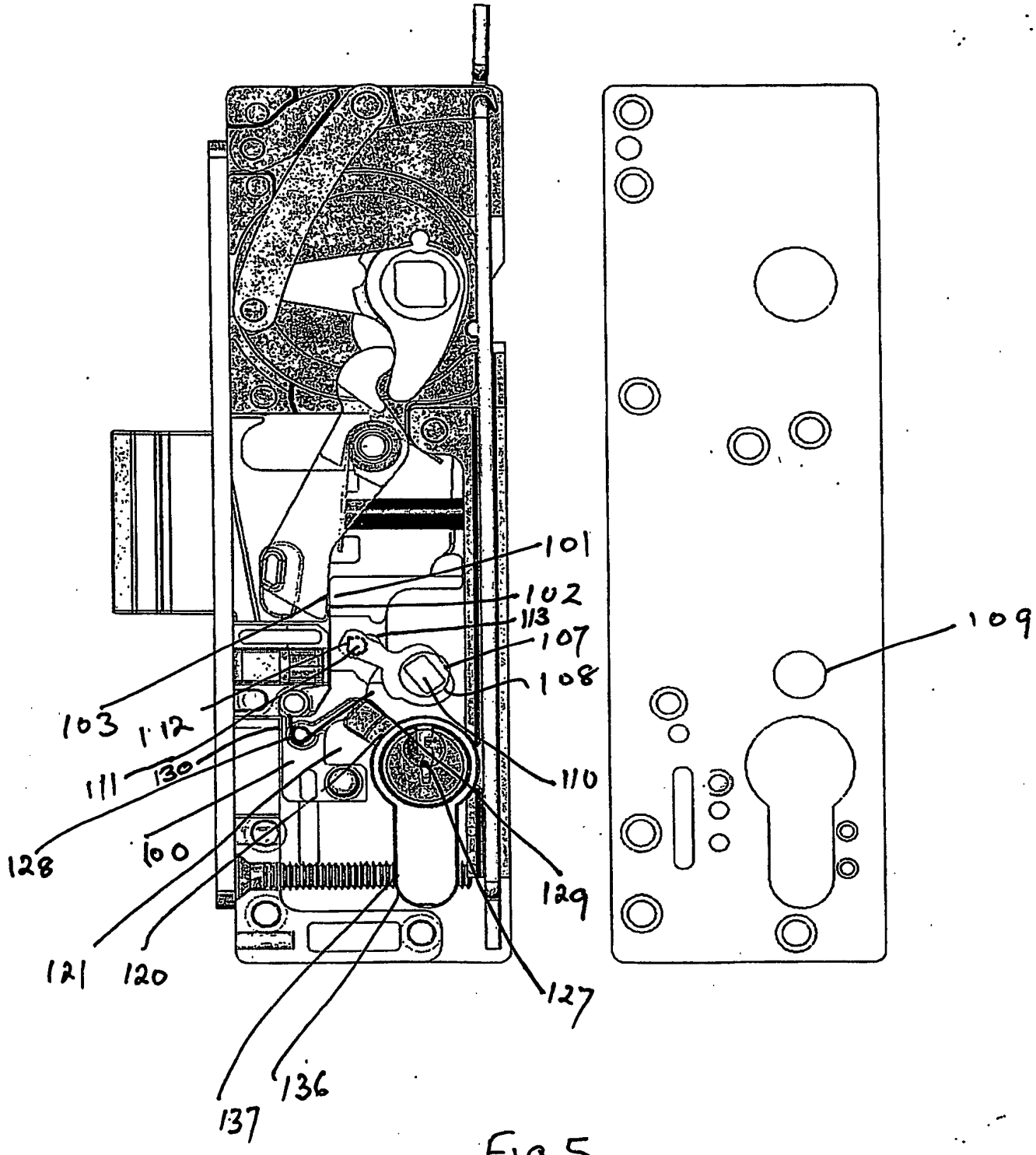
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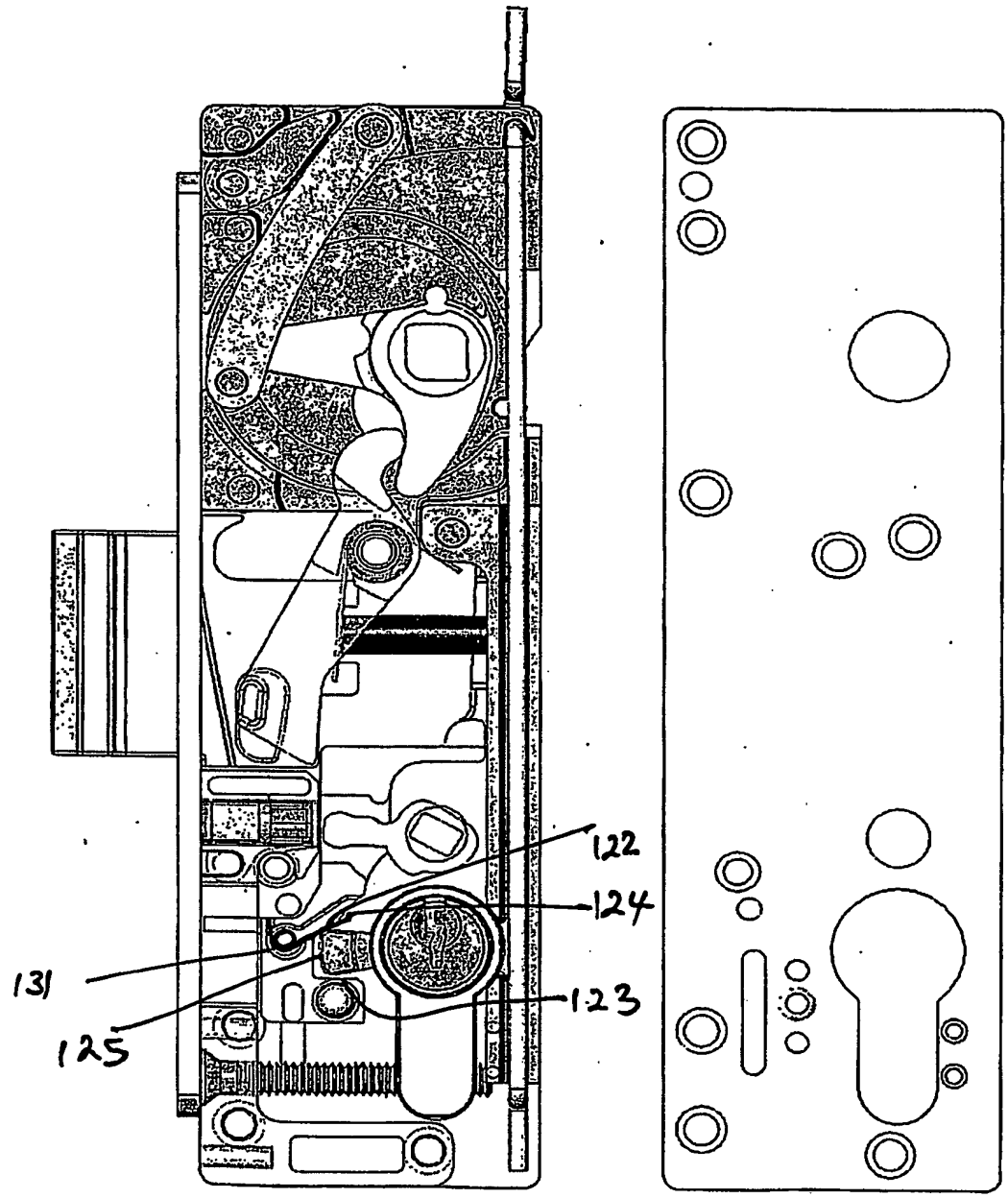
Fig 5



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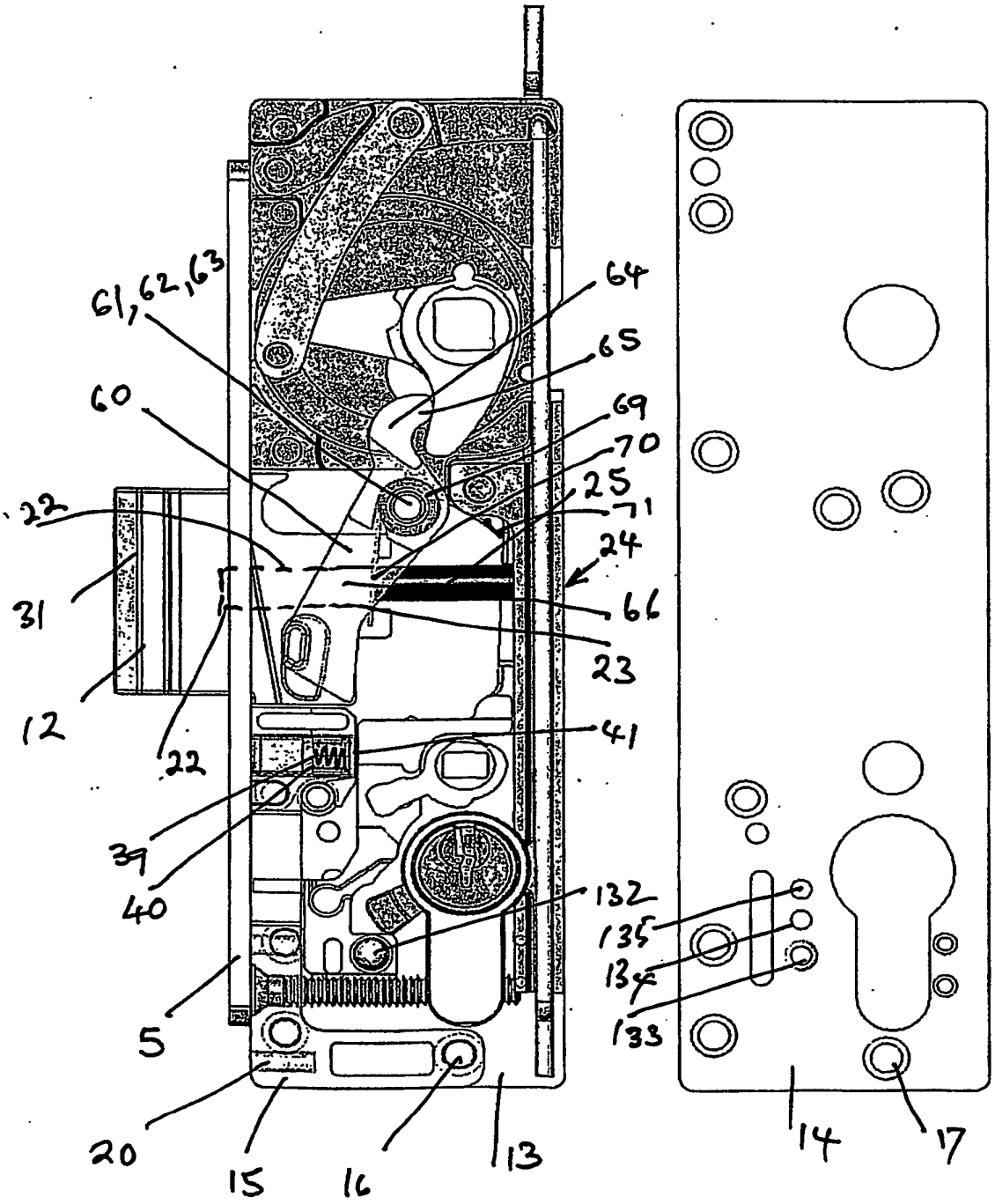
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Fig 3

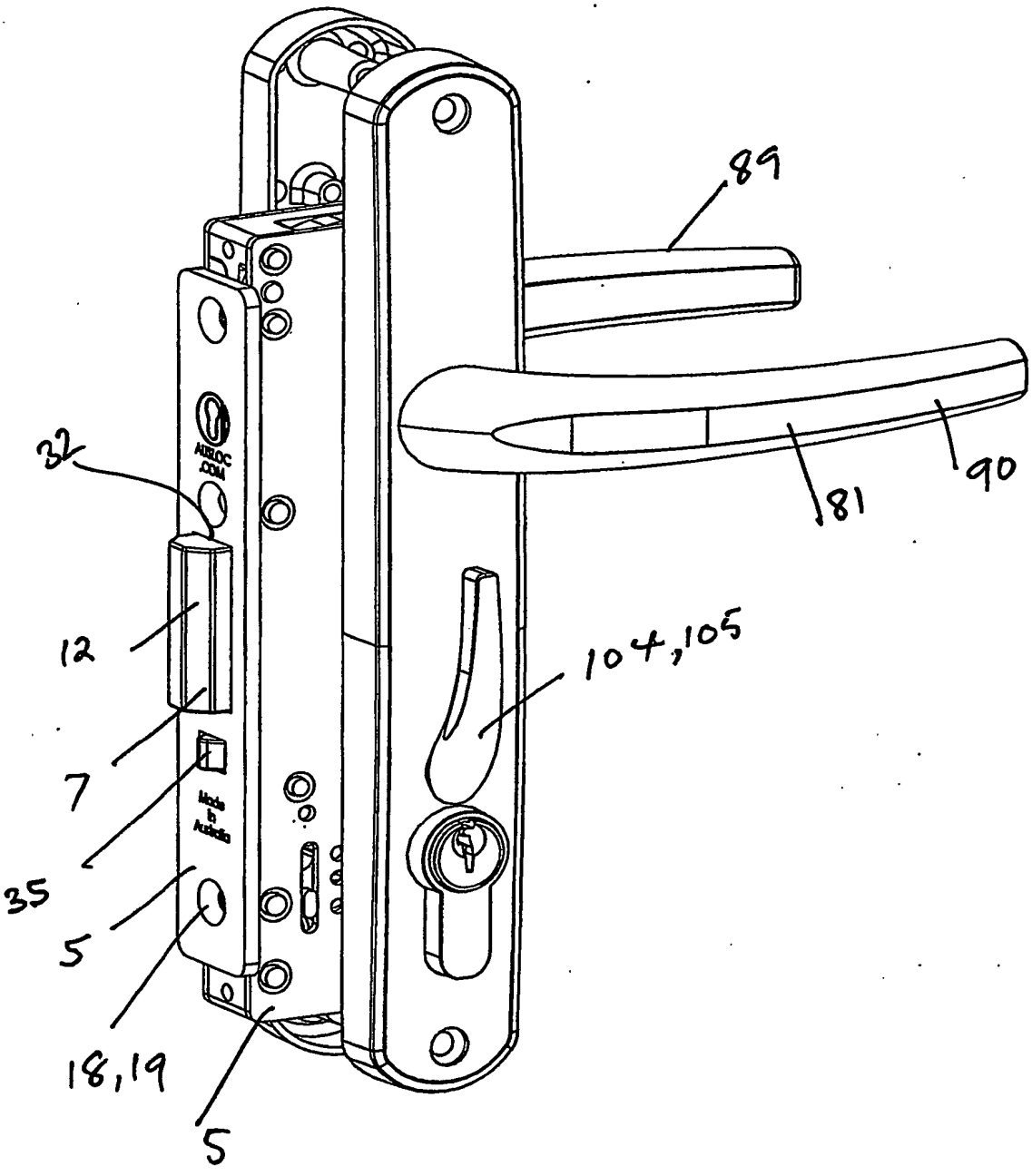

Fig 2